Dengue Fever

The clinical course of illness passes through the following three phases:

- **Febrile phase**
- **Critical phase**
- **Convalescent phase**

Four serotypes
- DEN-1
- DEN-2
- DEN-3
- DEN-4

Genotypes/subtypes
- DEN-1: 3
- DEN-2: 2
- DEN-3: 4
- DEN-4: 4
Dengue Fever:
An acute febrile illness of 2-7 days duration with two or more of the following manifestations:
   • Headache, retro-orbital pain, myalgia, arthralgia, rash, hemorrhagic manifestations.

Dengue Hemorrhagic Fever (DHF):
  a). A case with clinical criteria of dengue Fever plus
  b). Hemorrhagic tendencies evidenced by **one or more of the following**
      • Positive tourniquet test
      • Petechiae, ecchymoses or purpura
      • Bleeding from mucosa, gastrointestinal tract, injection sites or other sites

      Plus
  c). Thrombocytopenia (<100 000 cells per cumm) plus
d). 
• A rise in average haematocrit for age and sex ≥20%
• A more than 20% drop in hematocrit following volume replacement treatment compared to baseline
• Signs like pleural effusion, ascites, hypoproteinemia

Dengue Shock Syndrome (DSS):
*All the above criteria for DHF + rapid and weak pulse and narrow pulse pressure (≤20 mm Hg) or hypotension for age, cold and clammy skin and restlessness.*
**Expanded Dengue Syndrome (EDS)**

- Mild or Severe organ involvement may be found in DF/DHF. Unusual manifestations of DF/DHF are commonly associated with co-morbidities and with various other co-infections. Clinical manifestations observed in EDS are as follows:

<table>
<thead>
<tr>
<th>System</th>
<th>Unusual or atypical manifestations</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNS involvement</td>
<td>Encephalopathy, encephalitis, febrile seizures, I/C bleed</td>
</tr>
<tr>
<td>G. I. involvement</td>
<td>Acute Hepatitis / fulminant hepatic failure, cholecystitis, cholangitis</td>
</tr>
<tr>
<td>Renal involvement</td>
<td>Acute renal failure, hemolytic uremic syndrome, acute tubular necrosis</td>
</tr>
<tr>
<td>Cardiac involvement</td>
<td>Cardiac arrhythmia, cardiomyopathy, myocarditis, pericardial effusion</td>
</tr>
<tr>
<td>Respiratory</td>
<td>Pulmonary oedema, ARDS, pulmonary hemorrhage, pleural effusion</td>
</tr>
<tr>
<td>Eye</td>
<td>Conjunctival bleed, macular hemorrhage, visual impairment, Optic neuritis</td>
</tr>
</tbody>
</table>
Case Definition

• Two types of cases: Probable and Confirmed cases

Probable Dengue Fever

A case compatible with clinical description (Clinical Criteria) of Dengue Fever.

(A positive test by RDT will be considered as probable due to poor sensitivity and specificity of currently available RDTs.)
**Case Definition**

**Confirmed Dengue Fever**

A case compatible with the clinical description of Dengue Fever with at least one of the following:

- **Isolation of the Dengue virus (Virus culture +VE) from serum, plasma, leucocytes.**
- **Demonstration of IgM antibody titre by ELISA positive in single serum sample.**
- **Demonstration of Dengue virus antigen in serum sample by NS1-ELISA.**
- **IgG sero-conversion in paired sera after 2 weeks with four fold increase of IgG titre.**
- **Detection of virus by polymerase chain reaction (PCR).**
Dengue case classification

Dengue Viral Infection

Symptomatic

Mild DF*

DF with high risk comorbid conditions

• Infants
• Old age
• Diabetes
• Hypertension
• Pregnancy
• CAD
• Hemoglobinopathies
• Immunocompromized patient
• Patient on steroids, anticoagulants or immunosuppressants.

A. Undifferentiated DF
B. Fever without complication like bleeding, hypotension and organ involvement
C. Without evidence of capillary leakage

Moderate DF

DF with warning signs and symptoms / DHF Gr I & II* with minor bleeding

A. DF with warning signs and symptoms
• Recurrent vomiting
• Abdominal pain/ tenderness
• General weakness/ letharginess/ restless
• Minor bleeding
• Mild pleural effusion/ ascites
• Hepatomegaly
• Increased Hct

B. DHF Gr I & II with minor bleeds

Severe DF

A. DF with significant Hemorrhage
B. (i) DHF with significant hemorrhage with or without shock
(ii) DHF III & IV (DSS) with shock with or without significant hemorrhage
C. Severe organ involvement (Expanded Dengue Syndrome)
D. Metabolites and electrolytes abnormalities

Asymptomatic

Tertiary level care

Close Monitoring and possibly Hospitalization

Home Management
Lab investigations for diagnosis & confirmation

- NS1 ELISA test to be done on patient reporting during 1st five days of fever
- Serology to be done on or after day 5 by Mac ELISA

RDT
- High rate of false positive compared to standard tests, while few are close to standard tests.
- Sensitivity and specificity of some RDTs also found to vary from batch to batch.
- Hence, a RDT positive case will be considered as probable case
Impression Signs of Dengue
Treatment of Dengue Fever & DHF I & II

- Fluids
- Rest
- Antipyretics (avoid aspirin and non-steroidal anti-inflammatory drugs)
- Monitor blood pressure, hematocrit, platelet count, level of consciousness
Treatment of DHF III & IV

All above treatment +
– In case of severe bleeding, give fresh whole blood 20 ml/kg as a bolus
– Give platelet rich plasma transfusion only when platelet counts are below 5,000–10,000/mm³.
– After blood transfusion, continue fluid therapy at 10 ml/kg/h and reduce it stepwise to bring it down to 3 ml/kg/h and maintain it for 24-48 hrs.
Chart 1. Volume replacement algorithm for patients with moderate Dengue Fever (DHF grades I & II)

Haemorrhagic (bleeding) tendencies, thrombocytopenia, Hct rise ≥ 20%

Initiate IV therapy 6 ml/kg/h crystalloid solution for 1–2 h

Check Hct

Improvement*

IV therapy by crystalloid successively reducing the flow from 6 ml/kg/h for 2–4 h to 3 ml/kg/h for 2–4 h and 3–1.5 ml/kg/h for 2–4 h

Further improvement

Discontinue IV after 24–48 h

No improvement**

Hct rises

Increase IV 10 ml/kg/h crystalloid for 2 h

Blood transfusion (10 ml/kg whole blood)/(5 ml/kg packed RBC)

Improvement

Hct falls

Suspect internal haemorrhage

Notes:
*Improvement: Hct falls, pulse rate and blood pressure stable, urine output rises
**No Improvement: Hct or pulse rate rises, pulse pressure falls below 20 mmHg, urine output falls
Chart 2. Volume replacement algorithm for patients with Severe Dengue Fever (DHF grades III)

Compensated shock
Pulse pressure ≤20 mmHg, hypotension (SBP <90mmHg), high Hct (>20% rise from baseline)

- Initiate IV therapy 10–20 ml/kg/h crystalloid solution for 1 h
- *Improvement in VS & Hct
  - Start IV therapy by crystalloid successively reducing the flow from 10 ml/kg/h for 1–2 h to 6 ml/kg/h for 2–4 h and 3–1.5 ml/kg/h for 2–4 h
  - Further Improvement in VS
    - Discontinue IV after 24–48 h
- **No Improvement in VS
  - Check Hct
    - Hct rises or is >45%
      - IV colloid/crystalloid 10–20 ml/kg over 1h
      - No improvement
        - Refractory hypotension
          - ABG
          - IV Inotropes with crystalloid maintenance fluid according to Holiday–Segar formula
    - Hct falls
      - Suspect bleeding
        - Blood transfusion (10 ml/kg whole blood)/ (5 ml/kg packed RBC)
        - No improvement
          - Improvement in VS
          - No improvement in VS

Crystalloid: Normal Saline, ringer lactate
Colloid: Dextran 40/degraded gelatine polymer (polygeline)
# ABCS = Acidosis, Bleeding, Calcium (Na++ & K+), Sugar

Notes:
* Improvement: Hct falls, pulse rate and blood pressure stable, urine output rises
** No improvement: Hct or pulse rate rises, pulse pressure falls below 20 mmHg, urine output falls
  • Unstable vital signs: urine output falls, signs of shock
  • In cases of acidosis, hyperosmolar or Ringer's lactate solution should not be used
  • Serial platelet and Hct determinations: drop in platelets and rise in Hct are essential for early diagnosis of DHF
  • Cases of DHF should be observed every hour for vital signs and urine output
Chart 3. Volume replacement algorithm for patients with Severe Dengue Fever (DHF IV (DSS))

Profound shock
Signs of shock, hypotension (BP undetectable), high Hct (>20% rise from baseline)

Oxygen

Immediate rapid volume replacement: give 10–20 ml/kg crystalloid solution as rapid bolus over 15–30 min

* Improvement in VS & Hct

** No improvement in VS

Repeat 10–20 ml/kg crystalloid/colloid* second bolus over 15–30 mins

Check Hct

Improvement in Hct & VS

Hct rises or >45%

IV colloid/crystalloid 10–20ml/kg over 1h

No improvement

Improvement in VS

Hct falls

Suspicion of bleeding

Blood transfusion (10 ml/kg whole blood) / (5 ml/kg packed RBC)

Refactory hypotension

Look for ABCS

No improvement in VS

IV inotropes with crystalloid maintenance fluid according to Holiday–Segar formula

Notes:
* Improvement: Hct falls, pulse rate and blood pressure stable, urine output rises
** No Improvement: Hct or pulse rate rises, pulse pressure falls below 20 mmHg, urine output falls

- Crystalloid: Normal Saline, ringer lactate
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Notes:
* Improvement: Hct falls, pulse rate and blood pressure stable, urine output rises
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- Unstable vital signs: Urine output falls, signs of shock
- In cases of acidosis, hyperosmolar or Ringer’s lactate solution should not be used
- Serial platelet and Hct determinations: drop in platelets and rise in Hct are essential for early diagnosis of DHF
- Cases of DHF should be observed every hour for vital signs and urine output
MANAGEMENT OF DENGUE CASES AT PRIMARY HEALTH CARE LEVEL AND REFERRAL

**Acute Febrile illness <5days**

- Day of fever
- **Detail history:** Fever, Retro orbital pain, myalgia, bleeding, poor oral intake, decrease urine output
- Look for warning signs and symptoms

**Clinical examination:**
- Pulse
- BP
- Tachycardia
- Tachypnea
- Pulse pressure (narrow <20mm of Hg)
- Rash
- Mucosal bleeding
- Hepatomegaly
- Clinical evidence of plural effusion
- Ascites

**Bedside tests & investigations:**
- Tourniquet test
- Capillary filling time
- CBC
- Hct
- Platelet count

If possible send blood sample to nearby SSH laboratory for confirmation of Dengue infection\(^9\)

**Diagnosis:**
1. Mild Dengue
2. Moderate Dengue
3. Severe Dengue
   - A. DF with significant bleeding
   - B. DHF I & II with significant bleeding, DSS
   - C. Expanded Dengue Syndrome (EDS)
   - D. Serum metabolic acidosis
Management and referral of Dengue cases at PHC level

Management of DF/DHF*

- Stable orally accepting, Hct: Normal
  - Advice: plenty of oral fluid, PCM sos & warning signs explanation
  - Improvement

- Hb & Hct ↑
  - BP & pulse pressure: Normal
  - 6ml/kg/hr for 1-2 hrs crystalloid repeat Hct
  - Improvement

- 10- 20ml/kg crystalloid in 15-30 min bolus
  - Improvement

- Hb & Hct: ↑↑
  - Signs of circulatory failure significant bleeding
  - No Improvement
    - 10- 20 ml/kg/hr crystalloid for 1 hr ; Hct↑, bleeding++
      - Persistent hypotension, oliguria altered sensorium, active bleeding, rapidly falling Hct
      - No improvement

- Maintenance fluids (IV)
  - Hct: Normal
  - No improvement
  - TRANSFER TO HIGHER

HOME MANAGEMENT / DISCHARGE**

Improvement
Management of severe bleeding

• Immediate attempt should be made to stop the bleeding.
• Always consider hidden Internal bleeding possibility
• Watch for profound shock.
  – Urgent blood transfusion.
  – IV fluid or plasma expander..
• In case of massive haemorrhage - rule out coagulopathy by testing for prothrombin time (PT) and aPTT.
Indication of Platelet transfusion

- Platelet count less than 10000/cumm in absence of bleeding manifestations. (Prophylactic platelet transfusion).
- Prolonged shock with coagulopathy and abnormal coagulogram.
- Thrombocytopenia with haemorrhage.

> Packed cell transfusion/FFP along with platelets may be required in cases of severe bleeding with coagulopathy. Whole fresh blood transfusion doesn’t have any role in managing thrombocytopenia.
Warning sign and symptoms

- High grade fever
- Abdominal pain
- Persistent Vomiting
- Bleeding from any part of body
- Decreased urine output
- Respiratory distress
- Convulsions/encephalopathy
- Fluid overload.
- Plasma leakage
- Shock/ impending shock
Indications for domiciliary management:

If patients have the following conditions:

- No tachycardia / no hypotension/ no narrowing of pulse pressure /no bleeding/ no hemoconcentration
- Platelet count > 100000/cumm

Patient should come for follow up after 24 hrs for evaluation should report to nearest hospital immediately in case of the following complaints:

- Bleeding from any site (fresh red spots on skin, black stools, red urine, nose bleed, menorrhagia )
- Severe Abdominal pain, refusal to take orally/ poor intake, persistent vomiting
- Not passing urine for 12 hrs/decreased urinary output
- Restlessness, seizures, excessive crying (young infant), altered sensorium, behavioural changes, severe persistent headache; Cold clammy skin; sudden drop in temperature
Criteria for admission of DF patient

– Significant bleeding from any site
– Any warning signs and symptoms
– Persistent high grade fever (40ºC and above)
– Impending circulatory failure
– Tachycardia, postural hypotension, narrow pulse pressure (<20 mmHg, with rising diastolic pressure eg 100/90 mmHg), increased capillary refilling time > 3 secs (paediatric age group)
– Neurological abnormalities - restlessness, seizures, excessive crying (young infant), altered sensorium and behavioural changes, severe and persistent headache
– Drop in temperature &/or rapid deterioration in general condition
– Shock- cold clammy skin, hypotension/ narrow pulse pressure, tachypnoea. A patient may remain fully conscious until late stage
Criteria for discharge of patients

- Absence of fever for at least 24 hours without the use of anti-fever therapy
- No respiratory distress from pleural effusion or ascites
- Platelet count > 50 000/ cumm
- Return of appetite
- Good urine output
- Minimum of 2 to 3 days after recovery from shock
- Visible clinical improvement
NURSING CARE IN ADMITTED CASES

- Basic management
- Warning sign and symptoms
- Identifying and managing common problems in Dengue patients with-
  - High grade fever
  - Abdominal pain
  - Bleeding
  - Plasma leakage
  - Shock/impending shock
  - Decreased urine output
  - Respiratory distress
  - Convulsions/encephalopathy
  - Fluid overload.
Patient Follow-Up

• **Patients treated at home**
  – Instruction regarding danger signs
  – Consider repeat clinical evaluation

• **Patients with bleeding manifestations**
  – Serial hematocrits and platelets at least daily until temperature normal for 1 to 2 days

• **All patients**
  – If blood sample taken within first 5 days after onset of fever, need convalescent sample between days 6 - 30
  – All hospitalized patients need samples on admission and at discharge or death
Conclusion

- The guideline will provide systematic case management at all levels and helps to prevent complications and deaths.
- Proper Nursing Care is also important.
- Majority of the Dengue patients do not require platelet transfusion and there is no role of prophylactic platelet transfusion when platelet count is above 10000/cu mm.
- High risk groups need to be monitored closely.
- Looking for warning signs is crucial and timely referral if needed.
- Fluid management is very crucial.
- Unnecessary referral to tertiary centres to be avoided.
Contacts and Clarifications

• For all queries about phone numbers, email etc of concerned officials of Health Services like DMO, District Surveillance Officer (DSO) District Programme Manager (DPM), RCH Officer (RCHO) of your district, State Officials, institutions, specialists, etc, please call

• 24 x 7 NHM Health Services helpline DISHA on

• **0471-2552056** (Normal call, any line)

• **1056** (toll free from BSNL Lines)