

# DENGUE FEVER (DF) / DENGUE HAEMORRAGIC FEVER (DHF) / DENGUE SHOCK SYNDROME (DSS)

## WHEN TO SUSPECT/ RECOGNISE

### Case definition:

**Suspect Case Of Dengue Fever (DF) (For Level 1 & 2 Facility)** - An acute febrile illness of 2-7 days duration with two or more of the following:

- Headache
- Retro-orbital pain
- Myalgia
- Arthralgia
- Rash
- Hemorrhagic manifestations
- Leucopenia

**Probable Case Of DF (For Level 2 & 3 Facility)**- A case compatible with the clinical description with one or more of the following:

- Epidemiologically linked with a confirmed case of DF (occurrence at same location and time as other confirmed cases of DF).
- Supportive serology, if possible from a referral lab (reciprocal haemagglutination-inhibition antibody titre, comparable IgG EIA titre or positive IgM antibody test in late acute or convalescent-phase serum specimen, Antibody titre > 1280).

**Dengue Haemorrhagic Fever (DHF)** - A probable or confirmed case of dengue

- And Haemorrhagic tendencies evidenced by one or more of the following:
  - Positive tourniquet test (The tourniquet test is performed by inflating a blood pressure cuff to a point mid-way between the systolic and diastolic pressures for 5 minutes. A positive test is when 10 or more petechiae per 2.5 cm<sup>2</sup> are observed.) (DHF Grade I)
  - Petechiae, ecchymoses, purpura, haematemesis, malena, bleeding from mucosa, injection sites etc. (DHF Grade II)
- Along with thrombocytopenia (100,000 platelets or less per mm<sup>3</sup>) & evidence of plasma leakage due to increased vascular permeability, manifested by:
  - > 20% rise in average haematocrit for age and sex
  - > 20% drop in haematocrit following volume replacement treatment compared to baseline
  - Signs of plasma leakage (pleural effusion, ascites, hypoproteinaemia)

**Dengue Shock Syndrome (DSS)**

- All the above criteria of DHF, plus evidence of circulatory failure manifested by rapid and weak pulse, and narrow pulse pressure (< 20 mm Hg) or hypotension, cold, clammy skin and altered mental status. (DHF Grade III)
- Profound shock with undetectable BP or pulse (DHF Grade IV)

**Confirmed Case Of Dengue (For Level 4 Facility)** - A probable case with any one or more of the following confirmed by a referral lab:

- Isolation of the dengue virus from serum, plasma, leukocytes, or autopsy samples
- Demonstration of a fourfold or greater change in reciprocal IgG or IgM antibody titres to one or more dengue virus antigens in paired serum samples (depending on the diagnostic kit used)
- Demonstration of dengue virus antigen in autopsy tissue by immuno-histochemistry or immunofluorescence or in serum samples by EIA
- Detection of viral genomic sequences in autopsy tissue, serum or CSF samples by polymerase chain reaction (PCR)

### INCIDENCE OF THE CONDITION IN OUR COUNTRY

- Endemic disease, increasing outbreaks all over India
- Outbreaks with high death rates from DHF/ DSS
- Common in all age groups, but children usually have a milder disease than adults.
- Case Fatality Rate is high in DHF and DSS ( 40% - 50%); but with good physiologic fluid replacement therapy, rates should be about 3-5 %. CFR is low in dengue fever by itself.

### DIFFERENTIAL DIAGNOSIS

All epidemiologically relevant diseases listed under arthropod-borne viral fevers, measles, rubella and other systemic febrile illnesses, especially those accompanied by rash.

Important ones include:

- Measles
- Rubella
- Rickettsial fevers

### DIAGNOSTIC CRITERIA, INVESTIGATIONS, TREATMENT & REFERRAL CRITERIA

#### LEVEL 1: AT SOLO PHYSICIAN CLINIC:

**Clinical Diagnosis:** Incubation period commonly 5-7 days. (Range 5-21 days)

- Fever for 3-5 days, sudden onset, along with intense headache, myalgia, arthralgia, retro-orbital pain, anorexia, GI disturbances and rash (generalized erythema, with generalized maculo-papular rash usually appearing with defervescence).
- Minor bleeding phenomena, such as petechiae, epistaxis or gum bleeding, may occur at any time during the febrile phase.
- Dengue fever is a self limiting disease but in some cases with underlying pathologic changes, adults may have major bleeding phenomena, such as GI hemorrhage in peptic ulcer cases or menorrhagia.
- Recovery may be associated with prolonged fatigue and depression. Epidemics are explosive, but fatalities in the absence of dengue hemorrhagic fever are rare.
- In DHF/ DSS, coincident with defervescence, the patient's condition suddenly worsens with marked weakness, severe restlessness, facial pallor and circumoral cyanosis. Extremities are cool, skin blotchy, pulse rapid and weak; patients may be hypotensive with a narrow pulse pressure.
- Hemorrhagic phenomena are seen frequently and include scattered petechiae, a positive tourniquet test, easy bruisability, epistaxis, bleeding at venipuncture sites, petechial rash and gum bleeding. GI hemorrhage is an ominous prognostic sign that usually follows a prolonged period of shock. The liver may be enlarged, usually 2 or more days after defervescence.

**Investigations:** The diagnosis would be mostly clinical. However samples could be collected & sent for following lab investigations outside:

- Blood for TLC (Leucopenia), DLC
- Hematocrit
- Platelet Count (Thrombocytopenia) and monitor daily.

### Treatment

The management of dengue fever is symptomatic:

- Notification to all concerned health authorities.
- Bed rest during the acute febrile phase
- Antipyretics (avoid salicylates / ibuprofen) and tepid water sponging if temperature above 39°C. Tab Paracetamol 10mg/kg TDS
- Analgesics or mild sedatives if pain severe
- Increased fluid intake. In Children, with signs of some dehydration, oral rehydration solution and/or fresh juices are preferable (50ml/kg bodyweight fluids should be given during the first 4-6 hrs). After correction of dehydration, the child should be given maintenance fluids orally at the rate of 80-100 ml/kg body-weight in the next 24 hrs. Children who are breastfed should continue to be breastfed in addition to ORS administration. In adults, oral fluid intake of 2.5-4.0 litres should be given per day.
- Patients observed for complications for at least 2 days after recovery from fever as life threatening complications often occur during this phase. Patients and households should be informed that severe abdominal pain, passage of black stools, bleeding into the skin or from the nose or gums, sweating, and cold skin are danger signs, requiring urgent hospitalization.
- Monitor Platelet count every day.

### Referral criteria

- If platelet count <100,000.
- Minute spots on the skin suggesting bleeding within the skin
- Nose bleeds and gum bleeds, haematemesis
- Abdominal pain and/or passage of black tarry stool
- Refusal to food or drink
- Abnormal behaviour or drowsiness
- Difficulty in breathing or cold hands and feet, reduced amount of urine output.

### LEVEL 2: AT 6-10 BEDDED PRIMARY HEALTH CENTRE

**Clinical Diagnosis:** Same as Level 1 for a fresh case reporting directly.

### Investigations:

- Same as Level 1

### Treatment

- Same as Level 1
- IV fluids may be started before referral if DHF/DSS is suspected. Initiate IV therapy (5% Isotonic glucose saline) 6 ml/kg/hour for 3 hours.

**Referral criteria**

- Evidence of DHF as positive tourniquet test, bleeding, petichae, malena
- Thrombocytopenia and rise in haematocrit level (>20%)
- Evidence of pleural effusion, ascites, hypoalbuminemia

**LEVEL 3: AT 30-100 BEDDED COMMUNITY HEALTH CENTRE**

**Clinical Diagnosis:** It is possible that the patient may be in advanced stage of the disease or with complications manifest by the time he reaches this level. The only difference between DF and DHF Grade I is the presence of thrombocytopenia and rise in haematocrit (>20%). Patients with DHF Grade I who live far away from hospital / not likely to be able to follow the medical advice should be kept in the hospital for observation. During the afebrile phase of DHF Grade II, the complications usually seen include abdominal pain, black tarry stools, epistaxis, bleeding from the gums, and continued bleeding from injection sites.

**Investigations:**

- Same as Level 2 for a fresh case reporting directly

**Treatment :**

- Same as Level 2 in case of uncomplicated DF
- Initiate IV therapy (5% Isotonic Glucose saline/ 5% Glucose in Ringer lactate solution) 6 ml/kg/hr (for 3 hours)
- Check haematocrit /vital signs/urine output after 3 hours, and in case of improvement (i.e. Haematocrit falls, pulse rate and blood pressure stable, urine output rises), reduce IV therapy to 3ml/kg/hr (for 3 hours)
- In case of further improvement, continue IV therapy at 3ml/kg/hr (6- 12 hours) and then discontinue IV therapy.
- In case of no improvement (Haematocrit or pulse rate rises, pulse pressure below 20 mm Hg, urine output falls) increase IV therapy to 10 ml/kg/hr (for 1 hr). In case of improvement subsequently, reduce the volume of IV from 10ml/kg/hr to 6ml/kg/hr and further to 3ml/kg/hr accordingly.
- Generally, DHF Grades I and II do not have complications.

**Referral criteria:**

- DHF Grade I & II not responding to treatment.
- Patient having evidence of low pulse pressure, hypotension, cold clammy skin, restlessness.
- Platelet count to <100,000/mm<sup>3</sup> or less than 1-2 platelets/oil fields.

**LEVEL 4: AT 100 OR MORE BEDDED DISTRICT HOSPITAL**

**Clinical Diagnosis:** The afebrile phase of DHF Grade III includes circulatory failure manifested by rapid and weak pulse, narrowing of the pulse pressure and hypotension, and presence of cold clammy skin and restlessness. In DHF Grade IV, vital signs are unstable. The patient, in the early stage of shock, has acute abdominal pain, restlessness, cold and clammy skin, rapid and weak pulse.

**Investigations:**

- Same as Level 3; immediately after hospitalization, the haematocrit, platelet count and vital signs should be examined to assess the patient's condition.
- Dengue IgM and IgG titres, Dengue virus isolation.

**Treatment****DHF Grade III**

- Check haematocrit /platelet count. Initiate IV therapy (5% Isotonic Glucose saline) 10 ml/kg/h.

- Check haematocrit, vital signs, urine output every hour.
- If patient improves, IV fluids should be reduced every hour from 10 to 6ml/Kg/h, and from 6 to 3 ml/kg/h which can be maintained up to 24 to 48 hours.
- If patient has already received one hour treatment of 10 ml/kg/hr of IV fluids and vital signs are not stable, check haematocrit again and
- If haematocrit is increasing, change IV fluid to colloidal solution preferably Dextran or Plasma at 10 ml/kg/h every hr.
- If haematocrit is decreasing, give fresh whole blood transfusion, 10 ml/kg/h and continue fluid therapy at 10 ml/kg/h and reducing it stepwise bring down the volume to 3 ml/kg/h and maintain it up to 24-48 hours.

#### DHF Grade IV

- Initiate IV therapy (5% Isotonic Glucose saline) 20 ml/kg as a bolus one or two times
- Oxygen therapy should be given to all patients in shock; vitals monitored every 15-20 min
- In case of continued shock, colloidal fluids (Dextran or Plasma) should be given at 10- 20 ml/kg/hr.
- If shock still persists and the haematocrit level continues declining, give fresh whole blood 10 ml/kg as a bolus
- Vital signs should be monitored every 30-60 minutes
- In case of severe bleeding, give fresh whole blood 20 ml/kg as a bolus
- Give platelet rich plasma transfusion when platelet counts are below 5,000 - 10,000/ mm<sup>3</sup>.
- 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.

#### Convalescent Phase

2-3 days after recovery from critical/shock stage strong pulse, normal blood pressure, improved general condition/return of appetite, good urine output, stable haematocrit, platelet count >50,000 per mm<sup>3</sup>. Patient could be discharged from hospital 2-3 days after critical stage; there may be bradycardia/arrhythmia, asthenia and depression. Management is essentially of rest, with normal diet and adequate oral fluids

#### Discharge Criteria

Absence of fever for at least 24 hrs with the use of antipyretic agents 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 per mm<sup>3</sup>

#### SUGGESTED READING

1. S Nimmanntya, Dengue Fever. In Cook Gordon, Zumla Alimudin editors. Manson's Tropical diseases; 21st edition. Saunders, Elsevier Science, 2003: 765-772.
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3. Clarence J Petres, Dengue. In Kasper Dennis L, Braunwald Eugene, Fauci Anthony S et al editors Harrison's Principles of Internal Medicine, 16th edition. Mc Graw Hill, Medical Publishing Division, 2005: 1164-1173.