

DENGUE HAEMORRHAGIC FEVER & DENGUE SHOCK SYNDROME

Figure 1. Clinical spectrum of Dengue infection

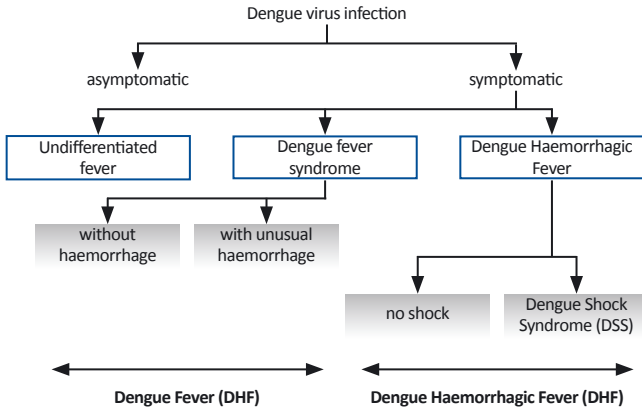


Table 1. Clinical Pointers to diagnosis

Pointers to clinical diagnosis of Dengue infection

- high fever of 3 or more days duration
- petechial haemorrhage, positive tourniquet test or other bleeding tendencies
- hepatomegaly
- pleural effusion or ascites
- shock
- fall in platelet count that precedes or occurs with a rise in haematocrit
- normal or low WBC with relative lymphocytosis
- maculopapular rash or generalised flushing

Note: all criteria need not be present at the same time

Note:

- Grade 3 and 4 = Dengue Shock Syndrome
- thrombocytopenia and haemoconcentration (rise in PCV by 5 g%) differentiates Grade 1 and 2 DHF from DF
- clinical differentiation of grade 1 and 2 DHF from DF is not always clear cut due to variation in baseline haematocrit
- all patients ill enough to need IV drip should be notified as DHF if baseline haematocrit unknown

WHO case definition of DHF

ALL of the following criteria must be present:

- fever, of high grade and continuous for 2-7 days duration.
- haemorrhagic diathesis or positive tourniquet test except in shock.
- thrombocytopenia (less than 100,000/mm³)
- haemoconcentration (HCT ≥ 20% relative to baseline) or evidence of plasma leakage

Table 2. WHO grading of DHF /DSS

Grade 1

Fever with constitutional symptoms. A positive Hess test.

Grade 2

Spontaneous bleeding (skin ± other bleeds) in addition to manifestations of grade 1

Grade 3

Circulatory failure (rapid weak pulse, pulse pressure < 20mmHg) but systolic BP still normal

Grade 4

Profound shock (hypotension, undetectable blood pressure and heart rate)

Other clinical manifestations suggestive of DHF:

- hepatomegaly
- circulatory disturbances (cool extremities, capillary refill > 2sec, tachycardia.)
- a fall in haematocrit following volume replacement.

Atypical Presentations

- acute abdominal pain, diarrhoea, severe gastro-intestinal haemorrhage
- severe headache, convulsions, altered consciousness
- encephalitis
- hepatic failure, obstructive jaundice,
- raised liver enzymes, Reye's syndrome
- acute renal failure,
- haemolytic uraemic syndrome
- disseminated intravascular coagulation
- vertical transmission in newborns

Table 3. How to do a Hess test

BP cuff pressure maintained between systolic and diastolic BP for 5 minutes. Positive if > 20 petechiae / 2.5 cm² area.

Table 4. Laboratory investigations

FBC, platelet, haematocrit
urea & electrolytes, creatinine,
liver function tests
PT/PTT
GXM - FFP, Platelet concentrates, whole blood
Blood culture
Dengue Blot Test
Hess Test (see Table 3)

In clinical practice, the following classification of dengue infection is proposed:

- *Dengue Fever*
 - Without increased vascular permeability
- *Dengue Haemorrhagic fever*
 - increased vascular permeability and fragility
 - evidence of pleural effusion, ascites or haemoconcentration > 20%

DHF can be further graded as follows:

- *DHF with no shock*
- *DHF with shock (DSS)* which can be further graded into:
 - DHF with compensated shock
 - signs of shock – tachycardia out of proportion to temperature, decreased tissue percussion as (cool extremities, late capillary refill time, narrow pulse pressure, weak pulses, oliguria, encephalopathy)
 - systolic pressure within the normal range
 - DHF with decompensated shock
 - signs of shock – tachycardia, cool extremities, late capillary refill time, weak or absent pulses, oliguria and altered conscious level
 - systolic hypotension

Assessment of circulation

- fluid intake for previous 1-2 days, vomiting losses
- urine output for past 24 hours and time of last micturation
- bleeding and amount
- degree of dehydration
- peripheral circulation
 - temperature and colour of extremities, capillary refill
 - distal pulses, pulse volume

- mental status: headache, irritability, combativeness, drowsiness, coma, seizures
(may indicate reduce cerebral perfusion, cerebral oedema or intracranial bleed)
- pleural effusion and ascites (third space loss)
- abdominal pain
(may indicate GI bleed, acute liver enlargement, hypovolaemia with intestinal ischaemia (shock))
- hypotension is a late sign.

Management

Grade 1 and 2 DHF

- admission, place IV cannulae.
- encourage oral fluids. IV fluids using 1/2 NS + D5% if unable to take orally and patients with evidence of plasma leakage.
- paracetamol for fever. Avoid NSAIDs.
- monitoring
 - clinical: pulses, temperature, heart rate, respiratory rate, and blood pressure
 - input/output chart, urine specific gravity
 - packed cell volume (PCV), platelets, Hb 8-12 hourly

Observations are continued until temperature returns to normal, in 1-2 days, and throughout the critical period, during the transition from febrile to afebrile phase (after 3rd day). Haemoconcentration usually precedes changes in pulse pressure and rate.

Dengue Shock Syndrome

- admit to ICU.
- obtain IV access.
- resuscitation: refer Fluid Therapy flow chart for DSS
- monitor:
 - vital signs, peripheral perfusion - blood pressure hourly till stable
 - PCV or haematocrit - platelet count 6 hrly
 - urea & electrolytes, serum creatinine - urine output
 - ABG
- fluid maintenance:
 - following fluid resuscitation, continue with 0.45% saline 5% dextrose at 1-2 times maintenance, guided by haematocrit, urine output and vital signs.
 - in general, the duration of vascular permeability lasts 1-2 days following onset of shock, after which further infusion of large volume of fluids may result in pulmonary oedema and pleural effusion.
- electrolyte and metabolic disturbances:
 - hyponatremia and metabolic acidosis occur in DSS. Isotonic fluids and restoration of tissue perfusion correct both problems.
 - correct hypoglycaemia that may occur in liver failure
- transfusion of blood and blood products.
- **Blood transfusion. Indications:**
 - significant haemorrhage
 - persistent shock despite crystalloids and low or declining haematocrit
 Fresh whole blood is preferable.
- **Platelet concentrate :Indications**
 - platelet count < 50,000/mm³ with bleeding
 - platelet count < 10,000 - 20,000/mm³
 Dose 10-20 ml/kg or 4 units/m² BSA over 1 hour.

- in the presence of Disseminated Intravascular coagulation (DIC)
 - cryoprecipitate (1 unit per 5 kg body weight) followed by
 - platelet concentrate (10-20 ml/kg or 4 units/m² BSA over 1 hour)
 - fresh frozen plasma (10-20 ml/kg)
- monitor coagulation profile regularly. i.e. PT, PTT, fibrinogen, D-dimer, or FPD and platelet counts.
- oxygen supplement via nasal cannula or mask.
- consider mechanical ventilation in
 - respiratory distress from massive pleural effusion
 - ascites or pulmonary oedema
 - severe shock with multi-organ failure
 - encephalopathy for cerebral resuscitation
- H₂ antagonists and Vitamin K

Complications of Dengue Shock Syndrome

- shock either persistent or recurrent
- pleural effusion and ascites
- bleeding - usually gastrointestinal
- hepatic dysfunction may result from dengue viral hepatitis or shock
- encephalopathy, usually occurs early before onset of plasma leakage
- beware of fluid overload and cardiac failure during the reabsorption phase

Special Notes

- insertion of nasogastric tube carries risk of trauma and bleeding. If required, use an oral route.
- blood product transfusion carry risk of disease transmission. Avoid if vital signs stable
- insertion of chest tubes carries risk of haemorrhage. Careful titration of iv fluids with doses of frusemide 0.25-0.5 mg/kg for 1-2 doses should make it possible to avoid chest tube insertion.
- central line insertion carries risk of bleeding. Intraosseous route is acceptable.
- use of steroids and immunoglobulin in DSS has no beneficial effect

Laboratory Diagnosis

Serology

- Dengue IgM Dot Enzyme Immunoassay
- interpret results in a clinical context. Serology may be negative in done early. A repeat study in 10 days will help confirm the diagnosis.

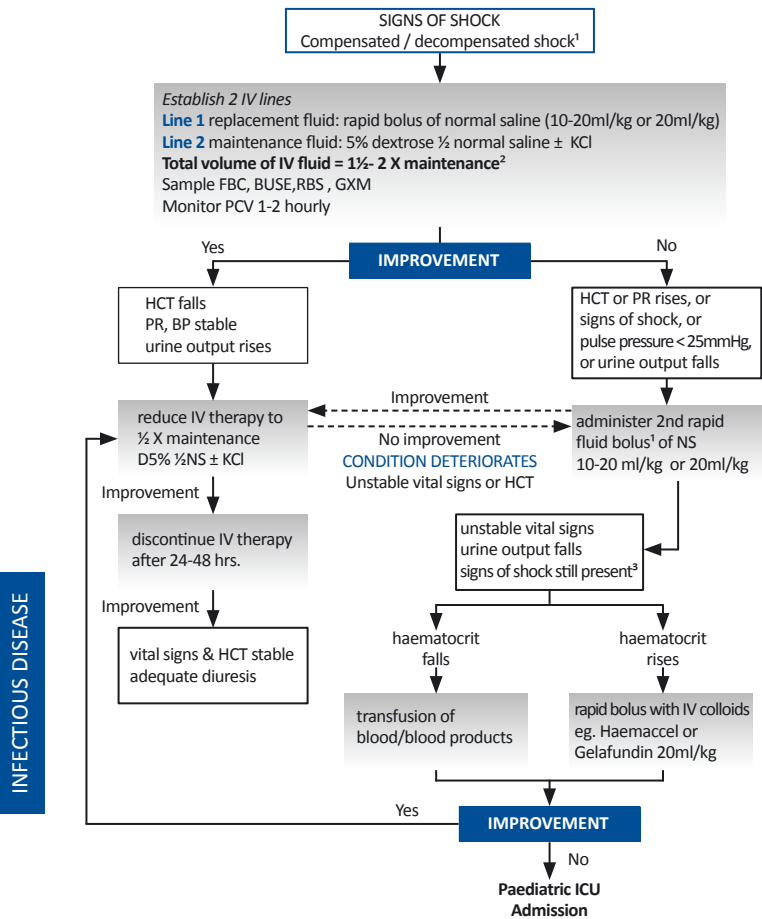
Virus isolation

- the most definitive diagnostic test. Availability limited.
- if patient dies soon after admission, a liver biopsy specimen sent in viral transport media may be useful in confirming the diagnosis.

Dengue RNA PCR

- may be indicated to confirm diagnosis

Figure 2. Fluid therapy for patients with DHF and DSS



footnote:

¹rapid fluid bolus

-in decompensated shock, give 20ml/kg fast

- in compensated shock give 10-20ml/kg over 30-60 minutes if patients is warming up

² use weight adjusted to height centile for age to calculate the volume of maintenance fluids

³ ensure good IV, check urinary catheter