QUICK REFERENCE FOR
HEALTHCARE PROVIDERS

Management of
Dengue in Children

(Second Edition)

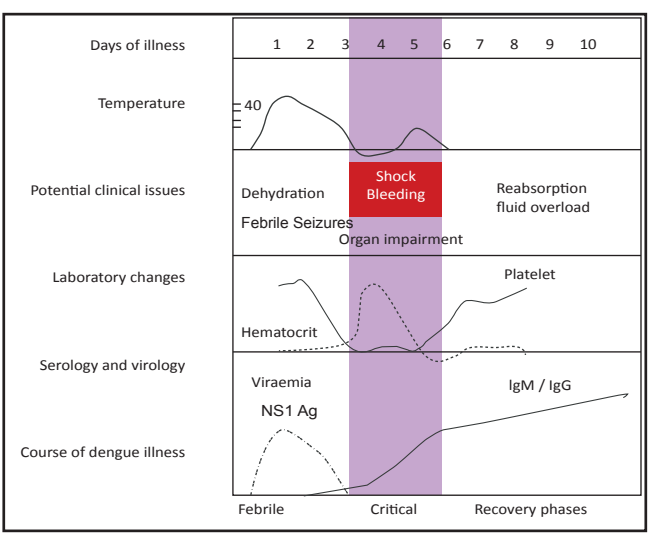
Ministry of Health
Malaysia

Academy of
Medicine Malaysia

KEY MESSAGES

1. Dengue in children has a wide spectrum of clinical presentations ranging from non-severe to life-threatening.
2. Children suspected of dengue infection should be tested with a combination of NS1 Antigen/IgM/IgG rapid test (dengue rapid combo test). ELISA for dengue may be used in centres where combo test is not offered.
3. Notification should be done for all suspected dengue cases from private and public health facilities by telephone/fax/e-notification to the nearest health office within 24 hours of diagnosis. This should be followed by written notification using the standard notification form.
4. Critical phase in dengue fever usually begins after the third (or earlier) day of illness (typically around the time of defervescence i.e. when temperature drops to and remains below 38°C). Plasma leakage may occur as a result of increased capillary permeability and is manifested by warning signs.
5. All children with dengue infection treated as outpatient should have daily clinical and laboratory monitoring using dengue record card until resolution of critical phase.
6. Isotonic crystalloid solutions should be used in resuscitation and maintenance therapy in children with dengue. Colloid solutions may be used in persistent shock despite resuscitation with crystalloid solutions.
7. Close monitoring and frequent reassessment should be done to guide appropriate fluid management of children with dengue shock.
8. Those with prolonged and/or decompensated shock should be admitted to the high-dependency or intensive care unit.
9. Blood transfusion should be given in life-threatening conditions and given as soon as severe bleeding is recognised (overt) or suspected (occult) in children with dengue.
10. Dengue infection in infants should be managed in a hospital with paediatric services.

THE CLINICAL COURSE OF DENGUE ILLNESS



WARNING SIGNS OF DENGUE IN CHILDREN

- Abdominal pain - abdominal tenderness and continuous pain (not intermittent)
- Persistent vomiting - (≥2 episodes of vomiting that amounts to fatigue or requires intravenous (IV) fluids
- Mucosal bleed - bleeding from nose, gums, conjunctiva, vagina, gastrointestinal/ respiratory/urinary tract
- Lethargy, restlessness
- Liver enlargement >2 cm
- Clinical fluid accumulation - pleural effusion and ascites
- Laboratory: increase in haematocrit (HCT) concurrent with decrease in platelet - HCT raised by 20% from the baseline value with concurrent decrease in platelet count ≤100 x 10^3 /µL

RISK FACTORS FOR SEVERE DENGUE IN CHILDREN

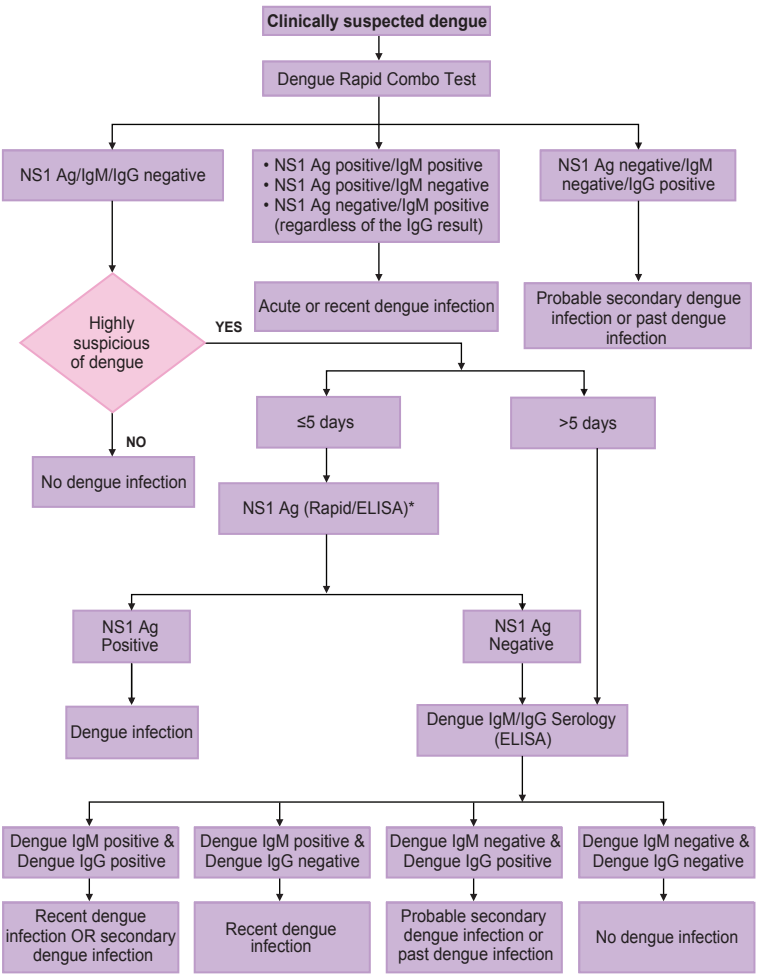
- Lethargy
- Abdominal pain
- Bleeding tendencies
- Hepatomegaly
- Haemoconcentration
- Thrombocytopenia of <100,000 /µL

HAEMODYNAMIC ASSESSMENT: CONTINUUM OF HAEMODYNAMIC CHANGES

Parameters	Normal Circulation	Compensated shock*	Decompensated / Hypotensive shock
Consciousness level	Clear and alert	Clear and alert	Change of mental state (restless, drowsy)
Extremities	Warm and pink extremities	Cold extremities	Cold, clammy extremities
Capillary refill time (CRT)	Brisk (<2 sec)	Prolonged (>2 sec)	Very prolonged, mottled skin
Peripheral pulse volume	Good volume peripheral pulses	Weak & thready peripheral pulses	Feeble or absent peripheral pulses
Heart rate	Normal heart rate for age	Tachycardia	Severe tachycardia with bradycardia in late shock
BP	Normal BP for age	• Normal systolic pressure with raised diastolic pressure • Postural hypotension	Hypotension/unrecordable BP
Pulse pressure	Normal pulse pressure for age	Narrowed pulse pressure (≤20 mmHg)	Unrecordable
Respiratory rate	Normal respiratory rate for age	Tachypnoea	Metabolic acidosis/hyperpnoea
Urine output	Normal	Reducing trend	Oliguria/anuria

*unless the child is touched, parameters of shock will be missed e.g. cold extremities, weak peripheral pulses, prolonged CRT

DENGUE LABORATORY DIAGNOSIS

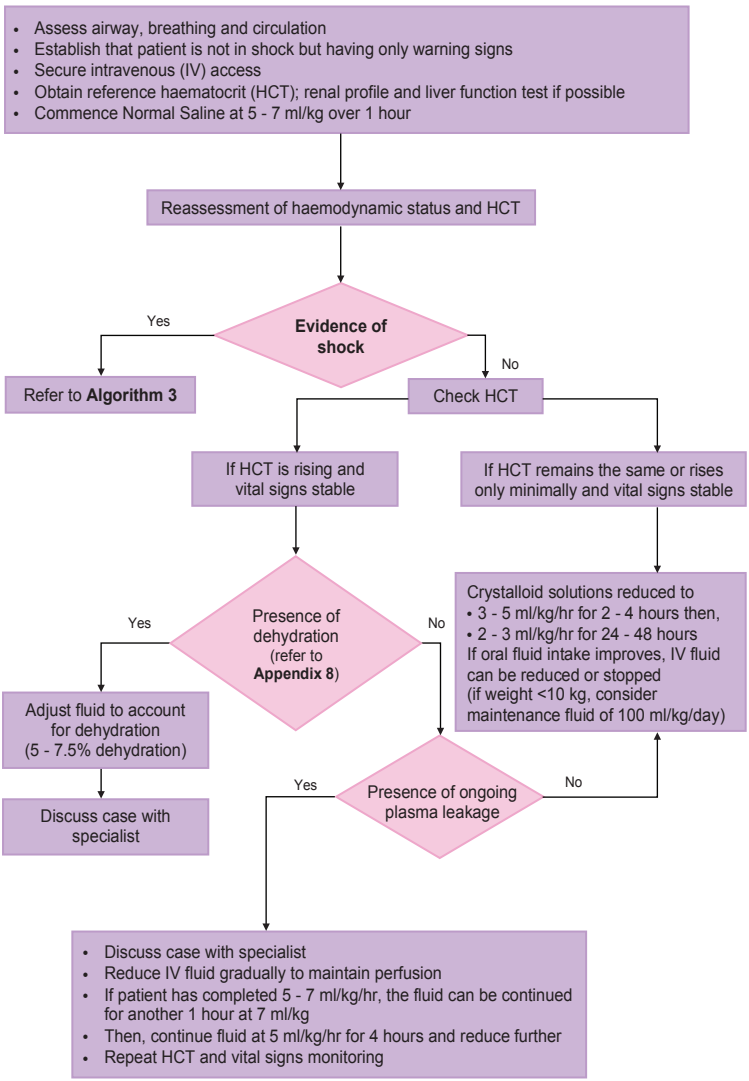


*Alternatively, Dengue Rapid Combo Test may be repeated

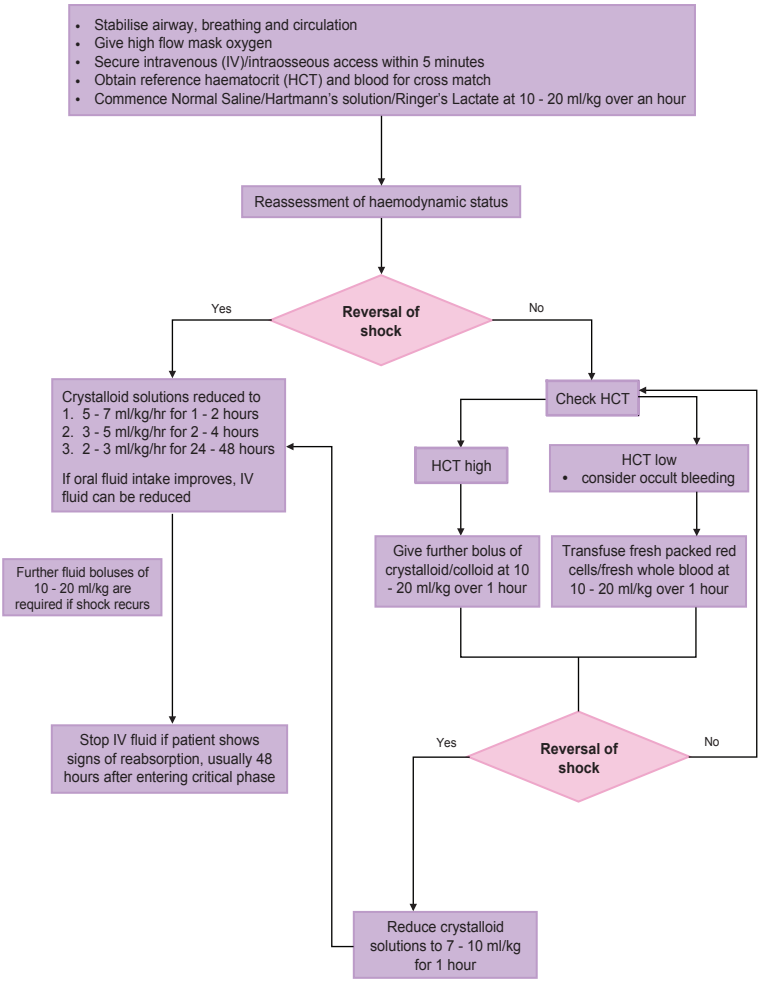
- PCR should be sent if NS1 Ag/serology negative in suspected severe dengue or mortality cases.
- ELISA for dengue may be used in centres where combo test is not offered.

ELISA - enzyme-linked immunosorbent assay
IgG - Immunoglobulin G
IgM - Immunoglobulin M
NS1 Ag - Non-structural protein 1 Antigen
PCR - polymerase chain reaction

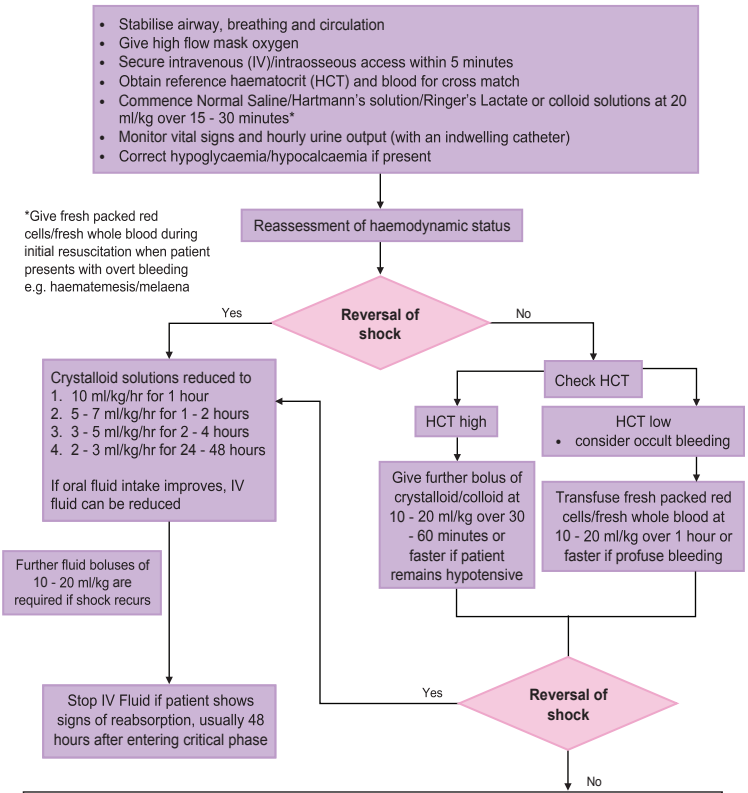
FLUID MANAGEMENT OF CHILDREN WITH DENGUE WARNING SIGNS



FLUID MANAGEMENT OF COMPENSATED DENGUE SHOCK IN CHILDREN



FLUID MANAGEMENT OF DECOMPENSATED DENGUE SHOCK IN CHILDREN



In refractory shock (patient remains in shock despite 40 - 60 ml/kg of crystalloid/colloid solutions or fresh packed red cells/ fresh whole blood), especially when HCT remains unchanged, consider:

- intubation to secure airway and ventilation
- concurrent bleeding and leaking
  - look for source if clinically not apparent yet
  - transfuse fresh packed red cells/fresh whole blood or blood components
  - check coagulation profile
- septic shock (co-infection)
  - take blood culture and start IV antibiotics (refer to National Antibiotic Guidelines 2019)
  - consider inotropes/vasopressors (adrenaline or noradrenaline)
- cardiac dysfunction
  - perform echocardiogram if available
  - consider inotropes/vasopressors (adrenaline or dobutamine)
- correction of electrolytes imbalances and acidosis
- monitoring of intra-abdominal pressure (IAP) - control ascitic fluid drainage with great caution if IAP is elevated

DISCHARGE CRITERIA

Clinical criteria	• No fever for 24 - 48 hours • Improvement in clinical status (general well-being, appetite, haemodynamic status, urine output) • Absence of respiratory distress • Resolution or recovery of organ dysfunction
Laboratory criteria	• Increasing trend of platelet count • Stable HCT without IV fluids

RANGE OF HAEMATOCRIT IN DIFFERENT AGE GROUPS

Age	HCT (%)
Cord blood	45 - 65
2 weeks	42 - 66
3 months	31 - 41
6 months - 6 years	33 - 42
7 - 12 years	34 - 40
Adult male	42 - 52
Adult female	37 - 47

This Quick Reference provides key messages & a summary of the main recommendations in the Clinical Practice Guidelines (CPG) Management of Dengue in Children (Second Edition)
Details of the evidence supporting these recommendations can be found in the above CPG, available on the following websites:
Ministry of Health Malaysia: www.moh.gov.my
Academy of Medicine Malaysia: www.acadmed.org.my

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