

# Clinical Practice Guide for the Management of Dengue Hemorrhagic Fever (DHF), Siriraj Hospital

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This clinical practice guidelines (CPG) was written up by the team composed of pediatric specialists in the fields of infectious diseases, critical care, hematology, and nephrology, who were experienced in treatment of children with dengue hemorrhagic fever in the Department of Pediatrics, Faculty of Medicine Siriraj Hospital. This CPG was intended to guide the house staff in order to assure the best outcome for every patient in the setting of Siriraj Hospital, a tertiary care center. This CPG may be applied for treatment in other settings but requires adaptation appropriate for the local facility. It is not intended to be the standard of care in large scale.

**The definition and severity classification in this CPG are based on WHO guidelines with clarification as following:**

**Case definition of DHF requires that all 4 criteria are met:**

1. Fever for 2-7 days (could be biphasic)
2. Evidence of bleeding tendency e.g. positive tourniquet test, petichiae, ecchymosis, purpura, hematemesis, melena, or bleeding in other site.
3. Thrombocytopenia (platelet count <100,000 cells/mm<sup>3</sup>)
4. Evidence of plasma leakage e.g. presence of pleural effusion, ascites, or hemoconcentration (increased of hematocrit of greater than 20% of baseline). In cases that baseline hematocrit is unknown, and

the patient was previously healthy, the average hematocrit of normal Thai children can be use as baseline as following: 30-35% for < 2 year-old, 35-40% for 2-10 year-old, 40-45% for >10 year-old.

**Severity grading of DHF is defined into 4 grades**

Grade I. With above case definition criteria but the only evidence of bleeding tendency is positive tourniquet test, and there is no change in vital signs

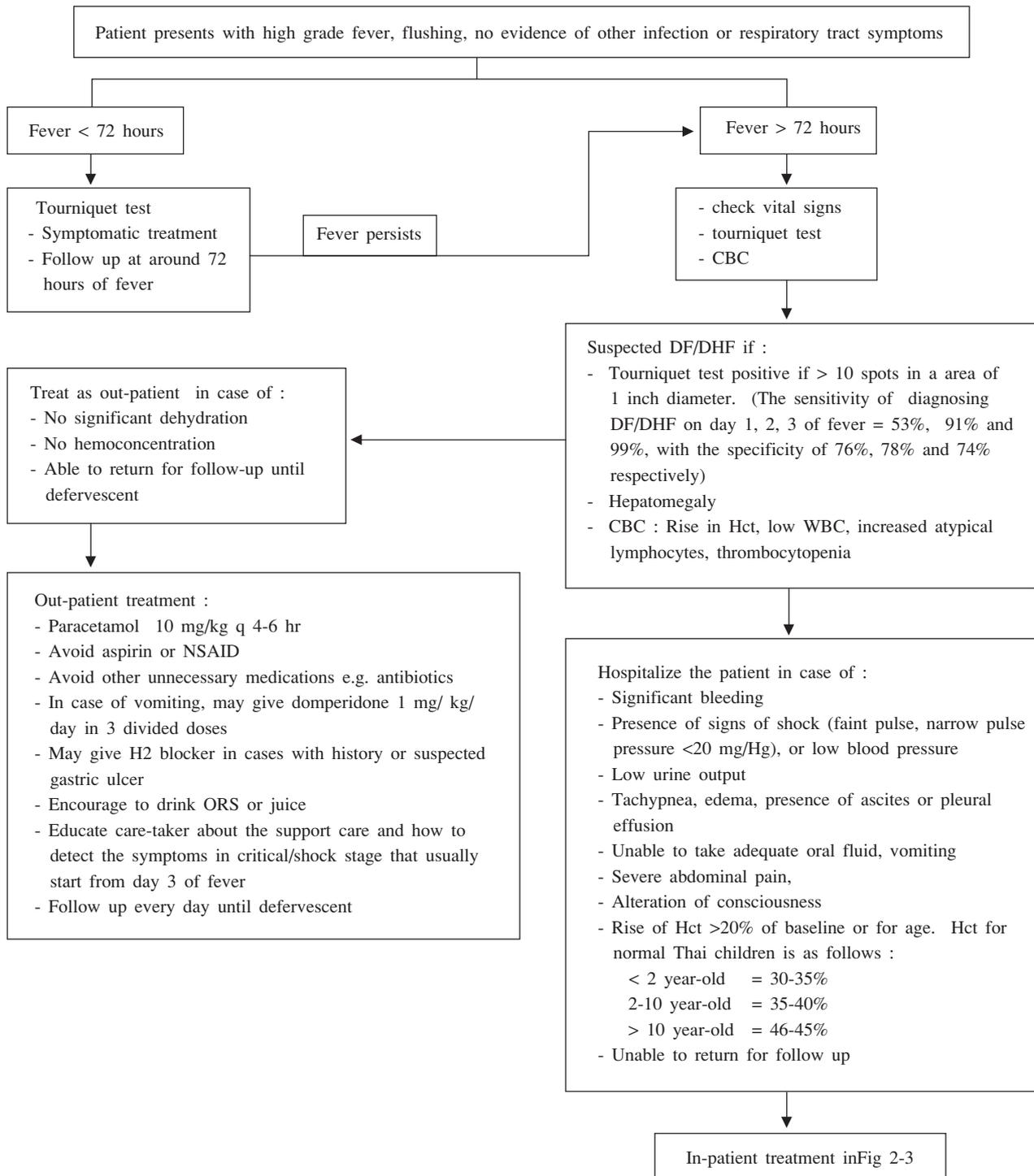
Grade II. Similar to grade I, but with more evidence of bleeding than tourniquet test. There is no change in vital signs.

Grade III. With the above case definition, and with changes in vital signs such as tachycardia, hypotension, narrow pulse pressure.

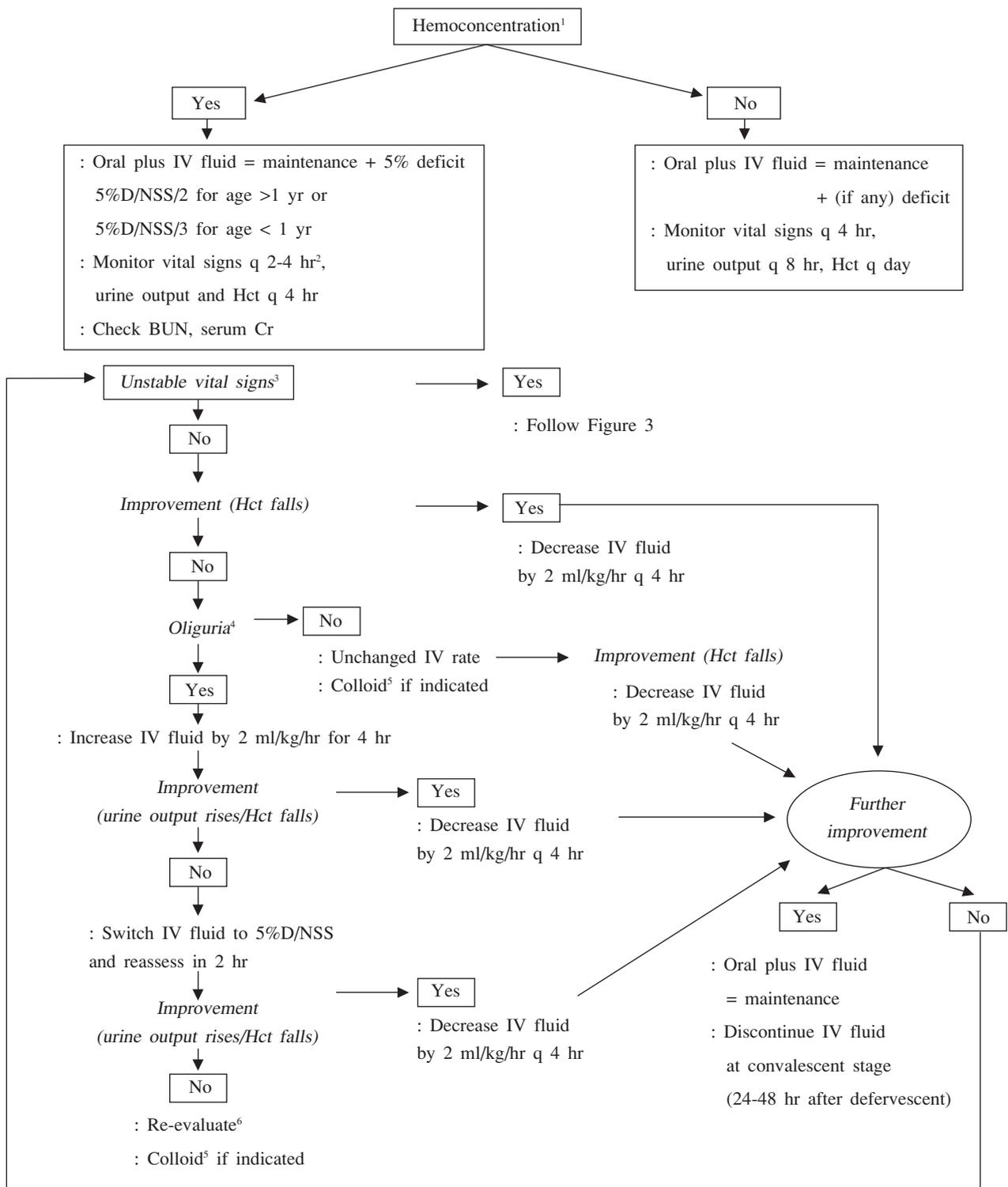
Grade IV. Those in grade III but with profound shock and/or massive bleeding.

**Confirmation of dengue virus infection**

Provisional diagnosis of DHF can be made by using clinical features, CBC, and tourniquet test. Laboratory confirmation of dengue infection can be done by serology, or viral isolation, or PCR. Because of availability and cost, serology is the most common method used. Most of the time, the results of these tests are not available during critical stage, and therefore are not use to guide the treatment.



**Fig 1.** Management of children with suspected DHF.



<sup>1</sup>Hemoconcentration: an increase in Hct  $\geq 20\%$

<sup>2</sup>Closely monitor vital signs if  $WBC \leq 5,000 /mm^3$  or increased atypical lymphocytes

<sup>3</sup>Unstable vital signs: pulse pressure  $\leq 20$  mmHg, hypotension, rapid and weak pulse, or capillary refill  $> 2$  second

<sup>4</sup>Oliguria: urine output  $< 500$  mL/ 24 hr./  $1.73 m^2$  in age  $> 1$  yr or  $< 1$  mL/ kg./ hr in age  $< 1$  yr

<sup>5</sup>Colloid solutions e.g. plasma, FFP, Dextran 40, Haemacel, 5% albumin

<sup>6</sup>Reevaluate for urinary retention and intrinsic renal failure, repeat physical exam and check lab eg. blood for BUN, Cr, electrolytes, sugar (check AST and ALT, if indicated)

\*Use an ideal body weight (weight for height) for calculation\*

**Fig 2.** In-patient volume replacement flow chart for a patient with dengue fever or dengue hemorrhagic fever grade I-II.



## Guideline for blood products transfusion in DHF

### PLATELETS TRANSFUSION

#### Indications

1. Platelet < 10,000 /cumm
2. Platelet < 20,000 /cumm with significant coagulopathy
3. Platelet < 50,000 /cumm prior to invasive procedure
4. Platelet < 50,000 /cumm with clinical significant bleeding i.e. hematemesis, melena, epistaxis not response to local treatment, pulmonary hemorrhage, bleeding from wound, hematoma

Dosage 0.1 unit of random donors platelet/kg/dose

### FRESH FROZEN PLASMA TRANSFUSION

#### Indications

1. Use as colloidal replacement fluid after failure of crystalloid replacement for > 2 hr, dosage not exceed 10 ml/kg/hr (max 40 ml/kg/day)
2. Use for correction of coagulopathy: liver coagulopathy, DIC, dosage 10-20 ml/kg/dose q 6-12 hr (max 40 ml/kg/day)
3. Use for plasmapheresis in hepatic failure
4. Use in combination with PRC for blood exchange transfusion or replacement of blood loss

#### Contraindication

1. Uncontrolled pulmonary edema
2. Congestive heart failure

### PRC TRANSFUSION

#### Indications

1. Hct < 35 % during shock stage
2. Hct declines > 5% in less than 4 hr or > 8% in less than 24 hr Hct prior to transfusion should not exceed 40%
3. Replacement therapy for massive bleeding
4. Use with FFP for blood exchange transfusion Dosage 10 ml/kg/dose for correction of anemia or drop of Hct Replacement of continuous blood loss cc/cc

Other Coagulation factors replacement

#### Factor VIIa (Novo seven)\*

#### Indications

1. Emergency life-threatening bleeding i.e. cerebral hemorrhage
2. Significant uncontrolled bleeding after maximum

platelet (0.4 unit of random donors platelet/kg/day) and maximum FFP transfusion (>40 ml/kg/day)

3. Significant life-threatening bleeding and unavailable platelet and/or FFP.

\* must consult hematology

### INDICATION FOR INFUSION OF COLLOID SOLUTION IN PATIENTS WITH DHF

1. In patients with DHF grade III or IV who have unstable vital signs despite of bolus crystalloid solution infusion of 10 ml/kg for 2 times.
2. In patients who still have hemoconcentration or unstable vital signs and had received a large amount of crystalloid solution, i.e. more than 70%, 80%, and 100% of amount of 24-hour maintenance fluid in children <1 year-old, 1-5 year-old, and >5 year-old, respectively.
3. In patients who have difficulty of breathing due to pleural effusion or ascites, but without the condition of congestive heart failure, pulmonary edema, or hypertension.

Note. Dextran 40 should be used as first choice because of long half-life and lower cost. Fresh frozen plasma (FFP) should be used in cases with bleeding problems or coagulopathy. Haemaccel and albumin should be used if the patient cannot use dextran 40 or had received dextran 40 up to limit of recommendation (table) and still required colloid therapy.

Colloid solution	Precaution	Dose
Dextran 40	-Caution in renal failure, thrombocytopenia, or active bleeding	-10 ml/kg i.v. drip in 1 hour. Can repeat but not exceed 20 ml/kg in the first 24 hour and 10 ml/kg/day afterward.
Haemaccel (Ureacrosslinked gelatin)	-Do not give together with citrate preserved blood	-10 ml/kg i.v. drip in 1 hour. Can repeat as needed.
5% Albumin	-Do not give in cases with congestive heart failure	-10 ml/kg i.v. drip in 1 hour. Can repeat but not exceed 120 ml/kg/day