Dengue Case Management

ASSESSMENT

Presumptive Diagnosis
Live in / travel to endemic area plus fever and two of the following:
- Nausea and vomiting
- Rash
- Aches and pains (headache, eye pain, muscle ache or joint pain)
- Warning signs
- Tourniquet test positive
- Leukopenia

Warning Signs
- Severe abdominal pain or tenderness
- Persistent vomiting
- Mucosal bleed
- Liver enlargement >2cm
- Clinical fluid accumulation
- Lethargy; restlessness
- Increase in HCT concurrent with rapid decrease in platelet count

No warning signs
For patients with warning signs of severe dengue OR co-existing conditions
- Pregnancy
- Infancy
- Diabetes mellitus
- Poor social situation
- Old age
- Renal failure

Group A
Outpatient management

Group B
Inpatient management

For patients with any of
- Severe plasma leakage with shock and/or fluid accumulation with respiratory distress
- Severe bleeding
- Severe organ impairment

Group C
Inpatient management
DON’T use corticosteroids. They are not indicated and can increase the risk of GI bleeding, hyperglycemia, and immunosuppression.

DON’T give platelet transfusions for a low platelet count. Platelet transfusions do not decrease the risk of severe bleeding and may instead lead to fluid overload and prolonged hospitalization.

DON’T give half normal (0.45%) saline. Half normal saline should not be given, even as a maintenance fluid, because it leaks into third spaces and may lead to worsening of ascites and pleural effusions.

DON’T assume that IV fluids are necessary. First check if the patient can take fluids orally. Use only the minimum amount of IV fluid to keep the patient well-perfused. Decrease IV fluid rate as hemodynamic status improves or urine output increases.

✓ DO tell outpatients when to return. Teach them about warning signs and their timing, and the critical period that follows defervescence.

✓ DO recognize the critical period. The critical period begins with defervescence and lasts for 24–48 hours. During this period, some patients may rapidly deteriorate.

✓ DO closely monitor fluid intake and output, vital signs, and hematocrit levels. Ins and outs should be measured at least every shift and vitals at least every 4 hours. Hematocrits should be measured every 6–12 hours at minimum during the critical period.

✓ DO recognize and treat early shock. Early shock (also known as compensated or normotensive shock) is characterized by narrowing pulse pressure (systolic minus diastolic BP approaching 20 mmHg), increasing heart rate, and delayed capillary refill or cool extremities.

✓ DO administer colloids (such as albumin) for refractory shock. Patients who do not respond to 2–3 boluses of isotonic saline should be given colloids instead of more saline.

✓ DO give PRBCs or whole blood for clinically significant bleeding. If hematocrit is dropping with unstable vital signs or significant bleeding is apparent, immediately transfuse blood.
Outpatient Management

During the febrile phase (may last 2–7 days) and subsequent critical phase (1–2 days), your clinic should

▶ Follow CBCs
▶ Watch for dehydration
▶ Watch for warning signs, including decreasing platelet count and increasing hematocrit
▶ Watch for defervescence (indicating beginning of critical phase)

Advise patient or their family to do the following

Control the fever
▶ Give acetaminophen every 6 hours (maximum 4 doses per day). Do not give ibuprofen, aspirin, or aspirin-containing drugs.
▶ Sponge patient’s skin with tepid water when temperature is high.

Prevent dehydration which occurs when a person loses too much fluid (from high fever, vomiting, or poor oral intake). Give plenty of fluids (not only water) and watch for signs of dehydration. Bring patient to clinic or emergency room if any of the following signs develop:
▶ Decrease in urination (check number of wet diapers or trips to the bathroom)
▶ Few or no tears when child cries
▶ Dry mouth, tongue or lips
▶ Sunken eyes
▶ Listlessness, agitation, or confusion
▶ Fast heartbeat (>100/min)
▶ Cold or clammy fingers and toes
▶ Sunken fontanel in an infant

Prevent spread of dengue within your house
▶ Place patient under bed net or have patient use insect repellent while febrile to avoid infecting mosquitoes that can infect others within 2 weeks.
▶ KILL all mosquitoes in house.
▶ Empty containers that carry water on patio.
▶ Put screens on windows and doors to prevent mosquitoes from coming into house.

Watch for warning signs as temperature declines 3 to 8 days after symptoms began. Return IMMEDIATELY to clinic or emergency department if any of the following warning signs appear:
▶ Severe abdominal pain or persistent vomiting
▶ Red spots/patches on skin
▶ Bleeding from nose or gums
▶ Vomiting blood
▶ Black, tarry stools
▶ Drowsiness or irritability
▶ Pale, cold, or clammy skin
▶ Difficulty breathing
Group B — Inpatient Management for Dengue Patients with Warning Signs

Patient admitted to hospital

- Obtain baseline complete blood count (CBC)
- Monitor fluid intake/output and encourage oral fluid intake
- Monitor vital signs every 4 hours or more frequently

Adequate Oral Fluid Intake
- Continue monitoring vital signs
- Observe for early signs of shock
- Observe for warning signs of severe dengue

Does patient have adequate oral fluid intake?

Yes

Inadequate Oral Fluid Intake
1. Check hematocrit (HCT)
2. Give intravenous isotonic crystalloid solution (NS, LR)*

Give isotonic crystalloids in stepwise manner:
1. 5-7 ml/kg/hour for 1-2 hours
2. 3-5 ml/kg/hour for 2-4 hours

- Recheck HCT
- Reassess clinical status of patient

No

Clinically Stable and No Change or Minimal Change in HCT
Continue isotonic crystalloids at 2-3 ml/kg/hour for 2-4 hours

- Recheck HCT
- Reassess clinical status of patient

If:
- Adequate fluid intake and urine output
- HCT decreases to baseline or slightly below baseline, but clinically stable

Then:
- Reduce isotonic crystalloids

Patient Develops Compensated or Hypotensive Shock
Follow steps for Group C Emergency Management

Worsening Vital Signs and Rapidly Increasing HCT
Increase isotonic crystalloid to 5-10 ml/kg/hour for 1-2 hours

- Recheck HCT
- Reassess clinical status of patient

Yes Is patient improving?

No

*NS: Normal saline, LR: Ringer’s lactate
Group C — Emergency Management for Dengue Patients with Compensated Shock

1. Patient admitted to hospital or intensive care unit for emergency treatment
   - Obtain baseline hematocrit (HCT) and organ function tests
   - Closely monitor fluid intake/output
   - Assess hemodynamic status and monitor vital signs every 1-2 hours

2. Patient is in Compensated Shock
   - Closely monitor fluid intake/output

   Hemodynamic Status Improved
   - Box B
     - Reduce intravenous fluids in stepwise manner:
       1. 5-7 ml/kg/hour for 2-4 hours
       2. Reassess clinical status

     If improving:
     - Give 3-5 ml/kg/hour for 2-4 hours
     - Recheck HCT and reassess clinical status

     If continued improvement:
     - Give 2-3 ml/kg/hour for 2-4 hours
     - Recheck HCT and reassess clinical status

     If:
     - Adequate fluid intake and urine output
     - HCT at baseline or slightly below baseline
     Then:
     - Discontinue intravenous fluids

   Increasing HCT
   - Give isotonic crystalloid at 10-20 ml/kg bolus over 1 hour
   - Reassess clinical status

   Has patient’s hemodynamic status improved?
   - Yes
     - Hemodynamic Status Not improved
       - Box C
         - Recheck HCT

     - No
       - Clinical Status is Improving
         - Reduce intravenous crystalloids to 7-10 ml/kg/hour for 1-2 hours

     Has clinical status improved?
     - Yes
       - Hemodynamic Status Not improved
         - Box C
           - Go to Box B
           - Transfuse
             - 5-10 ml/kg packed red blood cells
             - or 10-20 ml/kg whole blood immediately

     - No
       - Clinical Status Has Not Improved
         - Recheck HCT and reassess clinical status
         - Go to Box C

   Decreasing HCT
   - Patient Develops Hypotensive Shock
     - Follow steps for Group C Emergency Management for Dengue Patients with Hypotensive Shock

   Reassess clinical status

   Is HCT increasing or decreasing?
   - Yes
     - Hemodynamic Status Not improved
       - Box C
         - Recheck HCT

   - No
     - Clinical Status is Improving
       - Reduce intravenous crystalloids to 7-10 ml/kg/hour for 1-2 hours

     Has clinical status improved?
     - Yes
       - Hemodynamic Status Not improved
         - Box C
           - Go to Box B
           - Transfuse
             - 5-10 ml/kg packed red blood cells
             - or 10-20 ml/kg whole blood immediately

     - No
       - Clinical Status Has Not Improved
         - Recheck HCT and reassess clinical status
         - Go to Box C
# Normal Vital Signs

<table>
<thead>
<tr>
<th>Age</th>
<th>Estimated Weight</th>
<th>Normal Heart Rate Range</th>
<th>Average HR</th>
<th>Normal Respiratory Rate Range</th>
<th>Hypotension Level (Systolic BP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month</td>
<td>4 kg</td>
<td>110-180</td>
<td>145</td>
<td>40-60</td>
<td>&lt;70</td>
</tr>
<tr>
<td>6 months</td>
<td>8 kg</td>
<td>110-170</td>
<td>135</td>
<td>25-40</td>
<td>&lt;70</td>
</tr>
<tr>
<td>12 months</td>
<td>10 kg</td>
<td>110-170</td>
<td>135</td>
<td>22-30</td>
<td>&lt;72</td>
</tr>
<tr>
<td>2 years</td>
<td>12 kg</td>
<td>90-150</td>
<td>120</td>
<td>22-30</td>
<td>&lt;74</td>
</tr>
<tr>
<td>3 years</td>
<td>14 kg</td>
<td>75-135</td>
<td>120</td>
<td>22-30</td>
<td>&lt;76</td>
</tr>
<tr>
<td>4 years</td>
<td>16 kg</td>
<td>75-135</td>
<td>110</td>
<td>22-24</td>
<td>&lt;78</td>
</tr>
<tr>
<td>5 years</td>
<td>18 kg</td>
<td>65-135</td>
<td>110</td>
<td>20-24</td>
<td>&lt;80</td>
</tr>
<tr>
<td>6 years</td>
<td>20 kg</td>
<td>60-130</td>
<td>100</td>
<td>20-24</td>
<td>&lt;82</td>
</tr>
<tr>
<td>8 years</td>
<td>26 kg</td>
<td>60-130</td>
<td>100</td>
<td>18-24</td>
<td>&lt;86</td>
</tr>
<tr>
<td>10 years</td>
<td>32 kg</td>
<td>60-110</td>
<td>85</td>
<td>16-22</td>
<td>&lt;90</td>
</tr>
<tr>
<td>12 years</td>
<td>42 kg</td>
<td>60-110</td>
<td>85</td>
<td>16-22</td>
<td>&lt;90</td>
</tr>
<tr>
<td>14 years</td>
<td>50 kg</td>
<td>60-110</td>
<td>85</td>
<td>14-22</td>
<td>&lt;90</td>
</tr>
<tr>
<td>≥15 years</td>
<td>60-100</td>
<td>80</td>
<td>12-18</td>
<td></td>
<td>&lt;90</td>
</tr>
</tbody>
</table>

# Hemodynamic Assessment

<table>
<thead>
<tr>
<th>Hemodynamic Parameters</th>
<th>Stable Circulation</th>
<th>Compensated Shock</th>
<th>Hypotensive Shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conscious level</td>
<td>Clear and lucid</td>
<td>Clear and lucid</td>
<td>Restless, combative</td>
</tr>
<tr>
<td>Capillary refill</td>
<td>Brisk (≤2 sec)</td>
<td>Prolonged (&gt;2 sec)</td>
<td>Very prolonged, mottled skin</td>
</tr>
<tr>
<td>Extremities</td>
<td>Warm and pink</td>
<td>Cool peripheries</td>
<td>Cold, clammy</td>
</tr>
<tr>
<td>Peripheral pulse volume</td>
<td>Good volume</td>
<td>Weak and thready</td>
<td>Feeble or absent</td>
</tr>
<tr>
<td>Heart rate</td>
<td>Normal heart rate for age</td>
<td>Tachycardia for age</td>
<td>Severe tachycardia or bradycardia in late shock</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>▶ Normal blood pressure for age</td>
<td>▶ Normal systolic pressure, but rising diastolic pressure</td>
<td>▶ Narrow pulse pressure (≤ 20 mmHg)</td>
</tr>
<tr>
<td></td>
<td>▶ Normal pulse pressure for age</td>
<td>▶ Narrowing pulse pressure</td>
<td>▶ Hypotension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Postural hypotension</td>
<td>▶ Unrecordable blood pressure</td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>Normal respiratory rate for age</td>
<td>Tachypnea</td>
<td>Hyperpnea or Kussmaul’s breathing (metabolic acidosis)</td>
</tr>
<tr>
<td>Urine output</td>
<td>Normal</td>
<td>Reducing trend</td>
<td>Oliguria or anuria</td>
</tr>
</tbody>
</table>

**Centers for Disease Control and Prevention**
**National Center for Emerging and Zoonotic Infectious Diseases**
**Ideal Body Weight Tables**

### Boys and Girls

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Boys (kg)</th>
<th>Girls (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>7</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>8</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>9</td>
<td>29</td>
<td>29</td>
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<tr>
<td>10</td>
<td>32</td>
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<td>11</td>
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<td>15</td>
<td>56</td>
<td>52</td>
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<tr>
<td>16</td>
<td>61</td>
<td>54</td>
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<tr>
<td>17</td>
<td>65</td>
<td>55</td>
</tr>
<tr>
<td>18</td>
<td>67</td>
<td>56</td>
</tr>
<tr>
<td>19</td>
<td>69</td>
<td>57</td>
</tr>
</tbody>
</table>

### Adult Males and Females

<table>
<thead>
<tr>
<th>Height</th>
<th>Males (kg)</th>
<th>Females (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5’ (152 cm)</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>5’ 1” (155 cm)</td>
<td>52</td>
<td>48</td>
</tr>
<tr>
<td>5’ 2” (157 cm)</td>
<td>54</td>
<td>50</td>
</tr>
<tr>
<td>5’ 3” (160 cm)</td>
<td>57</td>
<td>52</td>
</tr>
<tr>
<td>5’ 4” (163 cm)</td>
<td>59</td>
<td>55</td>
</tr>
<tr>
<td>5’ 5” (165 cm)</td>
<td>61</td>
<td>57</td>
</tr>
<tr>
<td>5’ 6” (168 cm)</td>
<td>64</td>
<td>59</td>
</tr>
<tr>
<td>5’ 7” (170 cm)</td>
<td>66</td>
<td>62</td>
</tr>
<tr>
<td>5’ 8” (173 cm)</td>
<td>68</td>
<td>64</td>
</tr>
<tr>
<td>5’ 9” (175 cm)</td>
<td>71</td>
<td>66</td>
</tr>
<tr>
<td>5’ 10” (178 cm)</td>
<td>73</td>
<td>69</td>
</tr>
<tr>
<td>5’ 11” (180 cm)</td>
<td>75</td>
<td>71</td>
</tr>
<tr>
<td>6’ (183 cm)</td>
<td>78</td>
<td>73</td>
</tr>
<tr>
<td>6’ 1” (185 cm)</td>
<td>80</td>
<td>75</td>
</tr>
</tbody>
</table>

1 kg = 2.2 pounds

*Use Ideal Body Weight to calculate IV fluid rates in patients who weigh more than their Ideal Body Weight (i.e. in overweight patients).