Editorial

2023 Dengue Outbreak: Bangladesh Perspective

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Dengue fever (DF) is an infectious disease caused by one of four serotypes of the dengue virus (DENV) and spread by the bite of an infected Aedes mosquito.[1] DENV is a single-stranded RNA virus including four serotypes (DEN-1 to 4), belonging to the genus Flavivirus of Flaviviridae family. It is important to acknowledge that dengue can be caused by any one or more than one of the four serotypes of DENV and someone infected with any one serotype acquire lifelong immunity to that particular serotype. It is also well recognized that subsequent dengue infections with different DENV serotypes exaggerate the risk of developing severe dengue.[2] Dengue is considered one of the top ten global threats according to World Health Organization (WHO).[3] This year Bangladesh is experiencing the deadliest outbreak of DF since the first outbreak in 2000 in this country. Directorate General of Health Services (DGHS) of Ministry of Health and Family Welfare, Bangladesh registered 2,57,060 hospitalized cases and 1,272 dengue related deaths from 1st January 2023 to till date (23rd October, 2023).[4] Understandably total number of dengue cases would be much higher as majority of the patients do not require hospitalization and receive treatment in their home. In this year the dengue outbreak in Bangladesh have already exhausted the medical resources especially in Dhaka city where the intensity and fatality is fairly higher when compared with rest of the country. Now dengue has spread to all 64 districts of Bangladesh. Average case fatality rate (0.5%) and total number of deaths (1,272) this year (up to 23rd October) have already outnumbered all previous records since the first dengue outbreak (2000) in Bangladesh.[4]

Dengue infection is a systemic disease with a wide clinical spectrum that includes both severe and non-severe clinical presentation.[5] After the incubation period (3-10 days), the illness begins abruptly and is followed by three phases – febrile phase (2-7 days), critical phase (24-48 hours) and recovery phase (48 -72 hours).[6]

40%–80% dengue infections are asymptomatic. Most of the symptomatic dengue presents with mild to moderate fever. Only ≤5% of all dengue cases develop severe, life-threatening disease. For the diagnosis of DF early clinical findings are nonspecific and sometimes not conclusive, but recognizing early signs of shock and rapidly initiating intensive supportive therapy can reduce the risk of mortality among patients with severe DF.[7] New revised WHO dengue classification by severity recommended as follows: A) Dengue without warning signs: Group A (Home management). B) Dengue with warning signs and DF with co-morbid conditions: Group B (Require in-hospital care). C) Severe dengue: Group C (Require emergency management in a tertiary care hospital). Warning signs for dengue include, severe abdominal pain or tenderness, persistent diarrhea (> 3 times/day) and/or persistent vomiting (> 3 times/day), clinical fluid accumulation, mucosal bleed, lethargy, restlessness, liver enlargement > 2 cm and increase in hematocrit (Hct) concurrent with rapid decrease in platelet count. DF with high risk/co-morbid conditions include – infants, old age, diabetes, hypertension, pregnancy, coronary artery disease, immunocompromised patient and patient on steroids, anticoagulants and immunosuppressant. DF with severe dengue is defined by one or more of the following: (i) plasma leakage that may lead to shock (dengue shock) and/or fluid accumulation, with or without respiratory distress, and/or (ii) severe bleeding, and/or (iii) severe organ impairment (liver, heart,

brain, kidney etc.), and/or (iv) metabolic and electrolyte abnormalities.[6]

Symptomatic dengue infection have four types of clinical presentations such as, DF, dengue hemorrhagic fever (DHF), dengue shock syndrome (DSS) and expanded dengue syndrome (EDS).[8] Diagnostic criteria for DF include: live in or travel to dengue endemic area presenting with fever and 2 of the following criteria – nausea and/or vomiting; rash; aches and pain; positive tourniquet test; leukopenia (WBC < 5000 cells/mm³); platelet count ≤ 150,000 cells/mm³; rising Hct by 5-10% and any of the warning sign mentioned above. Diagnosis should be confirmed by laboratory tests.[8]

Clinical criteria for DHF are, high continuous fever for 2-7 days; hemorrhagic manifestations - tourniquet test positive, petechiae, epistaxis and hematemesis etc; ± liver enlargement; ± shock. Supportive laboratory evidence for dengue hemorrhagic fever are, i) evidence of plasma leakage evident by rising Hct ≥ 20%, pleural effusion, ascites, hypoalbuminemia (serum albumin < 3.5 g/dl). It is to be noted that, key differentiating point between DF and DHF is evidence of plasma leakage.[8]

Clinical signs of DSS include - cold extremities; delayed capillary refill time; lethargy or restlessness (possibly as a result of reduced brain perfusion); tachypnea or Kussmaul's breathing; tachycardia; weak pulse; narrow pulse pressure (pulse pressure ≤ 20 mmHg) and hypotension (systolic pressure < 90 mmHg for adults and children aged > 5 years and < 80 mmHg for children aged < 5 years).

EDS denotes unusual manifestations with severe organ involvement such as liver, kidneys, brain or heart associated with dengue infection reported in DHF and also in DF who do not have evidence of plasma leakage. These unusual manifestations may be associated with co-infections, co-morbidities or complications of prolonged shock.

Laboratory tests commonly performed in dengue infection are as follows: from day 1 to 5 of fever - CBC, NS1 antigen, ALT and AST is done. After day 7 of fever - IgM and IgG antibodies (day 5-7 window period) are done. Follow up testing may be done on 1st afebrile day, but should be done daily when DHF is suspected. A regular Hct is more important for management than the thrombocytopenia. In severe dengue, especially with shock, even hourly Hct is crucial for management.[8] Other organ function tests should be done, as indicated (CXR, ECG, echocardiogram, cardiac enzymes, renal and liver function tests, serum electrolytes, arterial blood gas analysis etc.). Physicians should strictly adhere to the dengue management guidelines provided by DGHS, Bangladesh and WHO; current updates are readily available in the respective websites.

Undeniably, vector (Aedes mosquito) control and personal protective measures for safety against mosquito bites are the mainstay of dengue prevention.[9]

As of 2023, there are two commercially available vaccines, sold under the brand names Dengvaxia (CYT-TVD) and Qdenga (TAK-003 / DENVax). Several countries of the world approved the use of these dengue vaccines with some recommendations. Until now, no dengue vaccine has been approved in Bangladesh.[10] Third phase trial of a dengue vaccine, supposed to be effective against all 4 serotypes is being conducted in Bangladesh, by the researchers from International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) and the Larner College of

Medicine at the University of Vermont (UVM), USA. This is a single-dose tetravalent dengue vaccine (TV005) which demonstrated safety and immune responsiveness in children and adults.[11] An effective and safe vaccine might be a game changer, until then we should focus on vector control and personal protective measures to safeguard ourselves from mosquito bites and adhere to available standard management protocols to save lives.

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