Information Sheet
Dengue Fever / Dengue Haemorrhagic Fever

Prevalence

Dengue fever (DF) is an acute febrile viral disease caused by dengue viruses which are flaviviruses and include serotypes 1, 2, 3 and 4.

According to the World Health Organization (WHO), DF has been reported in China, Thailand, the Philippines, Singapore, Malaysia, Indonesia and India. It is present also in Australia, New Zealand, United States, Mexico, many African and South American countries.

The geographical spread of both the mosquito vectors and the viruses over the past 25 years has led to the global resurgence of epidemic dengue fever/dengue hemorrhagic fever (DF/DHF), with the development of hyperendemicity in most urban centers in the tropics. Globally, 2.5 billion people live in areas where dengue viruses can be transmitted. Before 1970, only nine countries had experienced epidemic DHF; now, the number has increased more than fourfold and continues to rise. In an unprecedented pandemic in 1998, 1.2 million cases of dengue fever and DHF were reported to WHO from 56 countries. Data for 2001 – 2002 indicate a comparable situation. It is estimated that 50 million dengue infections occur each year, with 500 000 cases of DHF and at least 12 000 deaths, mainly among children.

In Hong Kong, DF is a statutory notifiable disease since March 1994. About 3 to 17 cases of DF were notified each year. In 2002 (Jan-Sept), 14 confirmed cases were reported, including three cases identified in a local outbreak in Ma Wan. Except for this local outbreak, all other reported DF cases acquired the infection from outside Hong Kong, most commonly from South East Asian countries. There have been no fatal cases.

Mode of Transmission

Dengue viruses are transmitted to humans through the bites of infective female *Aedes* mosquitoes, principally *Ae. aegypti*. This is a day biting species, with increased biting activity for 2 hours after sunrise and several hours before sunset. *Ae. albopictus*, which is abundantly found in Hong Kong, is less anthropophilic than *Ae. aegypti* and hence is a less efficient epidemic vector. Mosquitoes generally acquire the virus through feeding on the blood of an infected person. Once infective, a mosquito is capable of transmitting the virus to susceptible individuals for the rest of its life. Infected female mosquitoes may also transmit the virus to the next generation of mosquitoes by transovarial transmission i.e. via its eggs. Hence, once introduction into a community, it is virtually impossible to eradicate the disease without total elimination of the vector. The disease is not directly transmitted from person to person or through droplet spread. Patients are infective for mosquitoes from shortly before to the end of the febrile period, usually a period of 3-5 days.

Incubation Period

The incubation period is from 3 to 14 days, commonly 4-7 days.

Clinical Features

DF is an acute febrile infection characterized by sudden onset, fever for 3-5 days (rarely more than 7 and often biphasic), intense headache, myalgia, arthralgia, retroorbital pain, anorexia, gastrointestinal disturbances and rash. A generalized maculopapular rash usually appears about the time of defervescence. Minor bleeding phenomena, such as petechiae, epistaxis or gum bleeding may occur at any time during the febrile phase. Recovery may be associated with prolonged

fatigue and depression. Lymphadenopathy and leukopenia with relative lymphocytosis are usual; thrombocytopenia (less than 100 x $10^9/_L$) and elevated transaminases occur less frequently.

Dengue haemorrhagic fever (DHF) is characterized by increased vascular permeability, hypovolemia and abnormal blood clotting mechanisms. It is recognized principally in children, but occurs also in adults. The risk factor described best is the circulation of heterologous dengue antibody, acquired passively in infants or actively from an earlier infection. The WHO case definition for DHF includes all of the following : (1) fever or history of recent fever; (2) thrombocytopenia, platelet count equal to or less than 100 x $10^9/_L$); (3) hemorrhagic manifestations such as a positive tourniquet test, petechiae or overt bleeding phenomena; and (4) evidence of plasma leakage e.g. elevated haematocrit, serous effusion or hypoproteinaemia due to increased vascular permeability. Dengue shock syndrome (DSS) includes the more severe DHF patients plus signs of shock: (1) rapid, weak pulse; (2) narrow pulse pressure (less than 20 mm Hg); (3) hypotension for age; and (4) cold, clammy skin and restlessness. Case-fatality rates in DHF with untreated or mistreated shock have been as high as 40%-50%; with good physiologic fluid replacement therapy, rates should be 1%-2%.

Laboratory Diagnosis

Diagnosis of DF/DHF can be made using serological tests. A fourfold or greater rise in IgG or IgM antibody titres using haemagglutination-inhibition test in paired serum samples confirms the infection. IgM antibody, indicating current or recent infection, is usually detectable by day 6-7 after onset of illness. A number of commercial kits are available in the market.

During the acute febrile state of illness, virus can be isolated from blood or virus specific nucleic acid sequences may be detected by polymerase chain reaction.

Treatment

There is no specific treatment for DF. Treatment is supportive. No isolation of patient is required. Patients should be encouraged to drink plenty of fluid. Acetaminophen may be used to control fever and pain if necessary; Aspirin is contraindicated both because of its anticoagulant effects and the increased risk of developing Reye's syndrome.

Immunization

No vaccine is current available for DF. Vaccine development for DF and DHF is difficult because any of four different viruses may cause disease, and because protection against only one or two dengue viruses could actually increase the risk of more serious disease caused by another serotype. Nonetheless, progress is gradually being made in the development of vaccines that may protect against all four dengue viruses.

Prevention and Control

At present, the only method of controlling or preventing DF and DHF is to combat the vector mosquitoes. Vector control is implemented using environmental management and chemical methods. Proper solid waste disposal, elimination of stagnant water in domestic environment and improved water storage practices, including covering containers to prevent access by egg laying female mosquitoes are among methods which are encouraged through community-based programmes.

Department of Health
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