

*Synonyms: Breakbone fever, Dandy fever, Seven-day fever, Duengero, Ki denga pepo (Swahili - sudden overtaking by a spirit)*

### Overview

SS-RNA flavivirus infection (DENV 1-4) endemic in World tropical and sub-tropical regions (not Australia) borne by female mosquitoes (*Aedes aegypti* & less commonly *Aedes albopictus*). Dengue mosquitos can be found in central & far northern Queensland (outbreaks uncommon).

*Infection syndromes comprise*

- Asymptomatic infection
- Dengue fever (DF)
- Dengue haemorrhagic fever (DHF)
- Dengue shock syndrome (DSS)

### Epidemiology

- Endemic in the tropics and subtropics affecting mainly children.
- Most prevalent in SE Asia, Timor, Latin America and the Caribbean.
- It is the commonest of the flaviviruses with an estimated 100 million cases per year
- Rarely transmitted by needlestick, transfusions, transplants or blood exposure

### Risk Factors

- High population density. Urban living
- Poor public hygiene
- Exposure to mosquitoes in endemic areas
- Lack of immunity in children/travellers
- Severe Dengue most commonly occurs if re-infected by a different serotype

### Presentation

80% of primary Dengue infections are asymptomatic.

2-7 days after mosquito bites in tropics and subtropics area.

#### Symptoms

- Abrupt onset of fever (39.5-41.4°C) which may be biphasic, and myalgia
- Frontal or retro-orbital headache lasting 1-7 days
- Generalised macular, blanching (may be petechial) rash which usually fades after 1-2d
- Symptoms regress for 1-2d then rash reappears for 1-5d in maculopapular, morbilliform pattern, sparing palms and soles of feet ± desquamation. Fever recurs but not as high
- DF cases, but not DHF/DSS, experience severe bony and myalgia in legs, joints and lower back which may last for weeks (hence breakbone fever)
- Nausea, vomiting, cutaneous hyperaesthesia, taste disturbance and anorexia are common.
- Abdominal pain may occur and if severe suggests DHF pattern
- DHF also have pharyngitis, cough, hepatomegaly, bleeding ± DIC

#### Signs

- There may be hepatomegaly (DHF) and lymphadenopathy
- DHF sufferers exhibit a bleeding tendency as evidenced by petechiae, purpura, epistaxis, gum bleeding, GI haemorrhage and menorrhagia. There may be DIC or pleural effusion, ascites and pericarditis due to plasma leakage
- DSS pattern cases 20-30% of DHF progress → narrow pulse pressure, poor capillary refill → profound shock & severe hypotension. Occ CNS involvement e.g. encephalopathy, coma, convulsions

## Differential Diagnosis

### DF

- Malaria
- Glandular fever
- Coxsackie/enteroviruses
- Rickettsia
- Rubella
- Parvovirus B19
- Leptospirosis
- Influenza
- Chikungunya infections

### DHF

- Leptospirosis
- Chikungunya viral infections
- Kawasaki disease
- Yellow fever
- Hantavirus/other viral haemorrhagic infections
- Meningococcal septicaemia
- Encephalitic viruses, e.g. West Nile

### DSS

- As DHF plus shock e.g. from sepsis, haemorrhage, co-infection

## Investigations

Urine: Proteinuria, casts

Bloods: FBC ( $\downarrow$ plt,  $\uparrow$ PCV,  $\downarrow$ WCC with  $\uparrow$ L), coags/DIC screen, UEC ( $\uparrow$ Ur,  $\downarrow$ HCO<sub>3</sub>),  $\uparrow$ LFTs

Serology: Viral IgM & IgG ELISA, monoclonal Ab or haemagglutination; viral culture or PCR

Imaging: CXR ( $\uparrow$ effusion, pneumonia), CT (if  $\downarrow$ LOC)

Other: Malaria screen, blood culture, stool (FOB is early sign of DHF)

## Management

- No specific anti-viral treatment available currently
- Resuscitation - May require large volumes of IV fluid, inotropes, electrolyte replacement
- Blood components - may be required in DHF e.g. platelets, FFP
- Supportive - Paracetamol (avoid aspirin/ibuprofen - bleeding risk). Renal support. Treat secondary bacterial infections
- Some natural medicines popular e.g. Eupatorium perfoliatum (aka boneset) as a tea

## Prognosis

- Treated mortality rate 0.5-3%. Mainly in infants
- Untreated or with complications, then mortality can reach 50%

## Complications

- Hepatic failure
- Encephalopathy
- Myocarditis
- Disseminated intravascular coagulation

## Prevention

- Vaccines to prevent primary infection are still being researched
- Dengvaxia® (live-attenuated recombinant tetravalent vaccine) can be used in 9-45yo if previously infected and high risk of re-infection [Special Access Scheme]. CI: pregnancy.
- Anti-mosquito public health measures
- Repellents may reduce the risk (50% DEET - use during the day)
- Mosquito bed nets have limited risk reduction as some Aedes mosquitoes bite all day
- Biological control: Use of *Wolbachia*-carrying male Aedes or release of genetically altered mosquitos (to reduce production of female mosquitos)
- Unlike other viral haemorrhagic fevers, Dengue can't be aerosolised so  $\downarrow$ bioterrorism risk

## Further Reading

- Journal of Infection and Public Health: <https://doi.org/10.1016/j.jiph.2023.08.001>
- <https://immunisationhandbook.health.gov.au/>
- <https://www.health.nsw.gov.au/Infectious/factsheets/Pages/dengue.aspx>