Dengue fever

JONATHAN COHEN MB BS, FRACGP, MFM

Dengue should be considered in any traveller who has fever and symptoms occurring within three weeks of travel to a tropical area, especially an epidemic area. Because there is no vaccine, travellers must take measures to avoid mosquito bites.

According to reports published recently by ProMED (Program for Monitoring Emerging Diseases),[1] outbreaks of dengue fever have been diagnosed in Timor over the last few months, with at least 150 cases found in visitors to the area returning to Australia. These imported cases are in addition to the usual average of over 50 cases reported each year in Australia. This year, the incidence in Australia is rising, with 49 cases reported in February alone, mainly in Queensland and the Northern Territory.[2]

Epidemics have increased in frequency and severity in most tropical countries worldwide, and this is expected to continue indefinitely.[3] Over 100 million cases of dengue occur each year, half a million of which are the haemorrhagic form, with 25,000 fatalities.[3]

A recent article has emphasised the delay or absence of disease notification in Australia, which may pose a significant risk to public health.[4] Given the increasing incidence of dengue, it is worthwhile considering some relevant points.

Dr Cohen is Medical Director, Travel Clinics Australia, Medical Director, The Travel Clinic, Caulfield, and Senior Lecturer, Department of Community Medicine and General Practice, Monash University, Melbourne, Vic.

Clinical features

Dengue fever is characterised by sudden onset high fever, headache (often retro-orbital) and generalised muscle and/or joint pains. The latter explains the popular name 'breakbone fever'. It is a flu-like illness although there are no respiratory symptoms, and nausea and vomiting may be present. The measles-like rash appears about three to five days after the fever, is generally initially centripetal and may spread peripherally. The rash may not be present; in fact, many cases of dengue are mild or subclinical.

The disease may also present as a more severe and potentially fatal form, dengue haemorrhagic fever, which is characterised by abnormal haemostasis and vascular permeability. Dengue shock syndrome occurs with the additional presence of hypotension or narrow pulse pressure. There may be severe stomach pain, pale and clammy cold skin, bleeding or bruising, sleepiness or restlessness, constant crying, excessive thirst, dyspnoea or fainting. Fatality rates for dengue haemorrhagic fever and dengue shock syndrome are 2% and 10%, respectively.[5]

Infection with one serotype is thought to confer lifetime immunity, but with little or no likelihood of protection against infection with other serotypes. It is generally held that classic dengue is caused by the first infection with the virus and that dengue haemorrhagic fever may occur with subsequent infections with different strains. Although children and travellers are at greatest risk of dengue infection, the haemorrhagic form is not common because there would need to have been previous exposure to dengue fever. However, long term travellers or expatriates living in endemic areas are at significant risk. In addition to second exposure, risk factors for dengue haemorrhagic fever include the

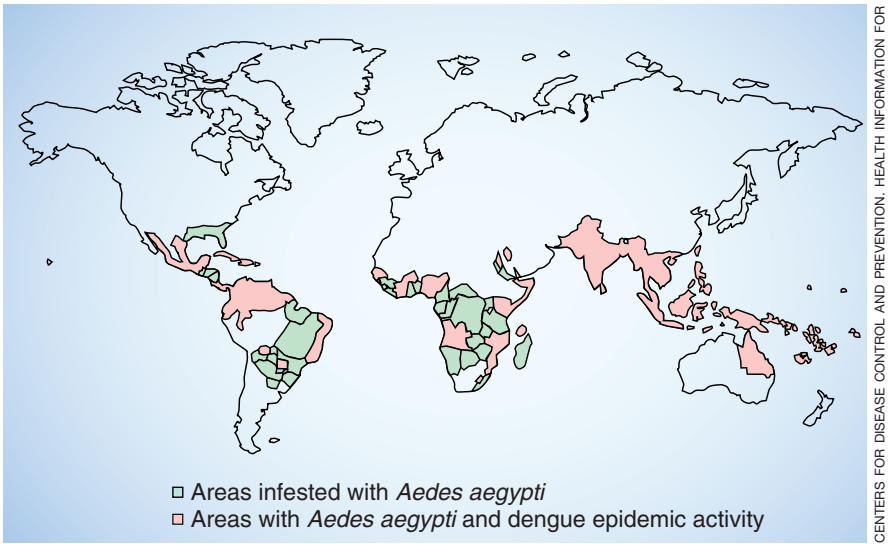

Figure. World distribution of dengue fever – 1998.

Downloaded for personal use only. No other uses permitted without permission. © MedicineToday 2000.

Avoidance of insect bites

- Regularly apply insect repellents containing diethyl toluamide (DEET), at a concentration less than 30%, on exposed skin areas (e.g. Rid or Aerogard in tropical strength). Avoid DEET concentrations greater than 30% on skin, especially in children.
- Wear long, loose, light-coloured clothing. Dark clothing, perfume, cologne and after-shave lotion attract mosquitoes.
- Stay in well screened areas.
- Use an aerosol repellent to spray the rooms.
- Use mosquito nets and clothing impregnated with permethrin.

Public health measures

- Cover water containers inside and outside the house.
- Ensure gutters and outside areas are well drained with no residual water.
- Remove rubbish that can collect water.
- Use biological control – with fish in ponds and lakes.
- Use chemical control.
- Conduct educational campaigns about public health measures and avoidance of bites.
- Formulate emergency plans to deal with increases in mosquito numbers or rates of dengue.

serotype, immune status, age and genetic background of the human host.

Endemic areas

Areas where the disease is endemic include Asia, the South Pacific, the Caribbean Basin, Africa, and Central and South America (Figure). Cases have recently occurred in Mexico and Texas, although the most common areas affected are South-East Asia and tropical South America. There have been five epidemics in north Queensland in the last decade;[6] however, because virtually all the cases have been imported, north Queensland is not considered to be an endemic area *per se*.

The virus and its mosquito vector

Dengue viruses are flaviviruses, as are yellow fever, Japanese encephalitis, Murray Valley encephalitis and West Nile viruses. There are four serotypes: DEN-1, DEN-2, DEN-3 and DEN-4. Although they are related, they do not confer cross-protective immunity. There is also no good evidence, as suggested in some texts, that immunisation against other flaviviruses confers immunity to dengue virus.

The virus is usually transmitted to humans by female *Aedes aegypti* mosquitoes. This species is endemic in Queensland and so there is a real risk of significant outbreaks. The mosquito prefers to feed in the early morning and late afternoon, although the risk is really day and night. Dengue can occur in urban as well as rural areas because the mosquito breeds in water containers in and around homes.

Management

Dengue should be considered in any traveller who has fever and symptoms occurring within three weeks of travel to a tropical area, especially if this is an epidemic area.

Paired serology should be requested, with acute and convalescent sera to measure changes in IgM and IgG respectively. The presence of thrombocytopenia is a further clue, and hence a full blood evaluation should also be requested. The laboratory will generally screen for flavivirus, and if the results are positive, it will continue to specific serology for each of the subtypes. Prior exposure may result in positive serology, hence the need for paired sera. PCR techniques are being used increasingly.

Treatment is symptomatic for uncomplicated dengue. Aspirin and NSAIDs should be avoided because of the risk of bleeding complications. Urgent referral of clinically suspected cases is recommended.

Preventive strategies

Because there is currently no vaccine, preventive strategies rest on avoidance of insect bites and public health measures (see the boxes on this page). MT

References

1. International Society for Infectious Diseases. ProMED Digest V2000 #71 (www.promedmail.org).
2. Communicable disease surveillance: highlights. Communicable Dis Intell 2000; 24 Supplementary (March): 79-80.
3. Centers for Disease Control and Prevention. Health information for international travel 1999-2000. Atlanta: DHHS, 2000: 80.
4. Malcolm RL, Hanna JN, Phillips DA. The timeliness of notification of clinically suspected cases of dengue imported into north Queensland. Aust N Z J Public Health 1999; 23: 414-417.
5. Lyerla R, Rigau-Pérez JG, Vorndam AV, et al. A dengue outbreak among camp participants in a Caribbean Island, 1995. J Travel Med 2000; 7: 59-63.
6. Mackenzie JS, Broom AK, Hall RA, et al. Arboviruses in the Australian region, 1990 to 1998. Communicable Dis Intell 1998; 22: 93-100.

Downloaded for personal use only. No other uses permitted without permission. © MedicineToday 2000.