Mosquito-borne illnesses

DR BERNIE HUDSON
MBBS,DTPH, FACTM,FAFPHM, FRACP, FRCPA
Clinical microbiologist and infectious diseases physician

These two illnesses are increasingly seen in returned travellers.

DENGUE FEVER

DENGUE fever is one of the most common exotic causes of fever in Australian travellers returning from developing countries. Many practitioners would suspect the diagnosis of this flavivirus infection when confronted with a febrile traveller who has returned from a developing country within the previous 14 days.

Dengue infection is confirmed by demonstrating the presence of the virus in the blood (usually by detection of dengue non-structural antigen or by PCR) and/or by detection of specific IgM and IgG antibodies to dengue virus. Viraemia usually lasts from one day before symptom onset until about five days after onset of symptoms.

Therefore, blood collected outside this period will be negative for virus, meaning that diagnosis will have to be confirmed by detection of specific IgM and IgG antibodies to dengue virus.

Diagnosis of the first infection with dengue can usually be confirmed by such antibody detection and, if necessary, blood may have to be collected up to four weeks later for convalescent serology to confirm the diagnosis. Even by such antibody testing, a small percentage of persons do not develop detectable antibodies.

There are four different virus subtypes, and prior infection with one subtype does not prevent infection with one of the other subtypes. When a second dengue infection occurs (e.g. some years later), serology may be difficult to interpret but, if blood is collected during viraemia, then PCR or antigen detection can confirm the diagnosis.

While treatment is mainly supportive until the acute illness resolves, a major part of management is to avoid aspirin and non-steroidal anti-inflammatories (NSAIDs) as these can aggravate the risk of bleeding. Usually, if analgesics or antipyretics are required, paracetamol is prescribed.

CHIKUNGUNYA

Infection with another mosquito-borne virus is being seen in travellers returning to Australia from developing countries. This arbovirus is chikungunya virus, an alphavirus. Other alphaviruses include Ross River virus (RRV) and Barmah Forest virus (BFV), both well-known as causes of epidemic polyarthritis in Australia.

As the name suggests, polyarthritis is a manifestation of RRV and BFV infections and so it is with the related chikungunya virus infection. The name chikungunya is thought to derive from a Makonde* word meaning 'contorted' or 'that which bends up' due to the effect the infection has on those infected (walking with a bent posture due to pain).

The virus is transmitted by the bite of a number of mosquito species including *Aedes aegypti* and *A. albopictus*, both also vectors of dengue virus infection.

A. albopictus has spread around the world in recent years and is difficult to eradicate once it has been introduced into a country, as it can thrive in temperate climates as opposed to *A. aegypti* that is more commonly found in tropical and subtropical regions.

There is now concern about the likely spread of chikungunya virus infection to Australia, following a recent epidemic in Papua New Guinea, with cases occurring in the Torres Strait Islands. Dengue outbreaks occur intermittently in Far North Queensland (FNQ), so if chikungunya virus is introduced into FNQ along with *A. albopictus*, chikungunya could prove more difficult to control, gaining a foothold in FNQ and then spread to the other states/territories.

The most common signs and symptoms of chikungunya infection include polyarthralgia, rash and fever. Interestingly, the rash may be very itchy but this has varied in different outbreaks. In an outbreak in Reunion in the Indian Ocean, the rash was pruritic in 20% of cases compared with an outbreak in Kerala, a state in India, where 80% of those affected reported a pruritic rash.

The incubation period is similar to that of dengue (average 2–4 days, range 1–12 days). The acute phase lasts for 1–2 weeks and most patients usually recover over the next few months. Persistent arthralgias and joint swelling can, however, last for years, especially in older patients and those with pre-existing osteoarthrosis.

Confirmation of the diagnosis of chikungunya virus infection is typically by detection of specific IgM and IgG antibodies to the virus and/or seroconversion. Neither virus antigen detection nor PCR is currently available as a routine diagnostic test in Australia, although they are likely to become available if chikungunya outbreaks occur in Australia.

DISTINGUISHING FEATURES

It is important in the early stages of illness to distinguish dengue from chikungunya, as NSAIDs used for chikungunya are contraindicated in dengue because of the risk of bleeding.

While a positive dengue PCR or dengue antigen test helps confirm dengue, negative tests do not exclude it because these tests are positive only when viraemia is present (usually in the first five days of illness), although antigen tests may remain positive for a day after viraemia.

Serology is more problematic as delayed seroconversion and false positive IgM tests can occur and second dengue infections can be difficult to confirm.

If chikungunya rather than dengue is suspected and pain is severe, it is probably better to use paracetamol and avoid NSAIDs and aspirin until the illness evolves and it is clear that the platelet count is staying in the normal range, and dengue is excluded.

*Makonde is a region of Tanzania where the virus was first isolated during an outbreak in 1952–53.