Editorial

Chikungunya fever

Sri Lanka Journal of Child Health, 2007;**36**: 3-5

(Key words: Chikungunya fever, Sri Lanka)

Chikungunya fever (CHIKF) is a viral disease transmitted to humans by the bite of infected mosquitoes. Chikungunya virus (CHIKV) is a member of the genus *Alphavirus,* in the family *Togaviridae*[1]. The disease was first described by Marion Robinson and W H R Lumsden in 1955, following an outbreak on the Makonde Plateau, along the border between Tanganyika and Mozambique, in 1952[2,3]. Its name comes from the Makonde language of southern Tanzania and northern Mozambique on the east coast of Africa. In Makonde, chikungunde is said to mean "that which folds up" and refers to the crippling of the joints[2].

The virus circulates throughout Africa, with transmission thought to occur mainly between mosquitoes and monkeys[1]. Genetic analysis of CHIK viruses have revealed two distinct lineages, one containing all isolates from western Africa and the second comprising all southern and east African strains, as well as isolates from Asia[4]. In Asia, virus strains have been isolated in Thailand in 1960, India in 1964, Sri Lanka in 1969, Vietnam in 1975, Myanmar in 1975 and Indonesia in 1982[5]. CHIKF displays interesting epidemiological profiles: major epidemics appear and disappear cyclically, usually with an inter-epidemic period of 7-8 years and sometimes as long as 20 years[5]. It has been estimated that over 180,000 cases have occurred in India since December 2005[6]. Apart from India, several small countries in the southern Indian Ocean such as the French Reunion Islands, Mauritius and Seychelles have also been reporting large scale outbreaks of CHIKV infection in 2006[6]. In Sri Lanka, CHIKV has appeared after an interval of 37 years. The severity of the current outbreak can be attributed to the absence of herd immunity in the affected population.

After an incubation period of 2-12 days there is a sudden onset of severe headache, high fever (>40°C) with chills, fatigue, muscle pain, joint pain, nausea, vomiting and rash[1]. This acute phase lasts 2-3 days. The temperature may remit for 1-2 days, resulting in a "saddle-back" fever curve[7]. The arthralgias are polyarticular, migratory, and predominantly affect the small joints of the hands, wrists, ankles and feet, with lesser involvement of larger joints. Pain on movement is worse in the morning, improved by mild exercise and exacerbated by strenuous exercise. Swelling may occur, but fluid accumulation is uncommon[7]. In his original report Robinson mentioned fever (100%), arthralgia (100%), myalgia (97%), headache (84%) and diffuse maculopapular rash (33%)[2]. Dermatological manifestations observed in a recent outbreak of Chikungunya fever in India include maculopapular rash, nasal blotchy erythema, pigmentation on face and extremities, lichenoid eruption and hyperpigmentation in photodistributed areas, multiple aphthous-like ulcers over scrotum, crural areas and axilla, lymphoedema (bilateral/unilateral), multiple ecchymotic spots (children), vesiculobullous lesions (infants), subungual haemorrhage and photo urticaria[8]. Pedal oedema is observed in many patients, the cause of which remains obscure as it not related to any cardiovascular, renal or hepatic abnormalities[8].

"Silent" CHIKV infections do occur but their frequency is not known[1]. Acute CHIKF typically lasts a few days to a couple of weeks but some patients have prolonged fatigue lasting several weeks[1]. Additionally, some patients have reported incapacitating joint pain or arthritis lasting for weeks or months[1]. The prolonged joint pain associated with CHIKV is not typical of dengue[1].

The symptoms are most often clinically indistinguishable form those observed in dengue fever[6]. Indeed, simultaneous isolation of both dengue and chikungunya from the sera of the same patient have been reported indicating the presence of dual infections[9]. Therefore, it is very important to clinically distinguish dengue from CHIKV infection. Unlike dengue, haemorrhagic manifestations are relatively rare and as a rule shock is not observed in CHIKV infection[6]. However, a small retrospective study in Bangalore showed serum samples that were clinically referred as dengue haemorrhagic fever (DHF), were negative for dengue but when further tested were positive for chikungunya[10]. The laboratory investigations and clinical presentations in these cases showed thrombocytopenia and petechial haemorrhage[10]. Most often chikungunya is a self limiting febrile illness[6]. However, neurological

complications such as meningoencephalitis have been reported in a small proportion of patients during the first Indian outbreak as well as the recent French Reunion islands outbreaks[11,12]. Mother to child transmission of CHIKV was recorded during the recent French Reunion islands outbreak[12].

CHIKV is highly infective and disabling but is not transmissible between people, being spread by the bite of an infected mosquito. Mosquitoes become infected when they feed on a person infected with CHIKV. Infected mosquitoes can then spread the virus to other humans when they bite[1]. CHIKV infection (whether clinical or silent) is thought to confer life-long immunity[1]. *Aedes aegypti*, a household container breeder and aggressive daytime biter, is the primary vector of CHIKV to humans[1]. *Aedes albopictus* may also play a role in human transmission[1]. The above mosquitoes are also the vectors for dengue fever (DF).

The definitive diagnosis can only be made by laboratory means, but CHIK should be suspected when epidemic disease occurs with the characteristic triad of fever, rash and rheumatic manifestations. Virus isolation is readily accomplished by inoculation of mosquito cell culture, mosquito, mammalian cell culture or suckling mice[7]. Viraemia will be present in most patients during the first 48 hours of disease and may be detected as late as day 4 in some patients[7]. Virus-specific IgM antibodies are readily detected by capture ELISA in patients recovering from CHIK infection and they persist in excess of 6 months. Haemagglutination inhibition (HI) antibodies appear with the cessation of viraemia. All patients will be positive by day 5 to 7 of illness. Neutralization antibodies parallel HI antibodies[7].

No specific antiviral treatment for chikungunya fever is available[1]. Treatment is symptomatic. Rest, fluids, and paracetamol may relieve symptoms of fever and aching. Aspirin should be avoided[1]. Movement and mild exercise tend to improve stiffness and morning arthralgia, but heavy exercise may exacerbate rheumatic symptoms. In unresolved arthritis refractory to non-steroidal anti-inflammatory drugs, chloroquine phosphate (250 mg/day) has given promising results[7].

No vaccine is available against this virus infection. Prevention is entirely dependent upon taking steps to avoid mosquito bites and elimination of mosquito breeding sites[3].

To avoid mosquito bites:

- Use insect repellent on exposed skin.
- Wear full sleeve clothes and long dresses or pants to cover the limbs.
- Have secure screens on windows and doors to keep mosquitoes out.
- Use mosquito coils and electric vapour mats during the daytime;
- Use mosquito nets to protect babies and others who may rest during the day. Efficacy of such nets can be improved by treating them with permethrin (pyrethroid insecticide).
- Curtains (cloth or bamboo) can also be treated with insecticide and hung at windows or doorways, to repel or kill mosquitoes.
- Infected persons should be protected from further mosquito exposure (staying indoors and/or under a mosquito net during the first few days of illness) so that they can't contribute to the transmission cycle[1].

To prevent mosquito breeding

Aedes mosquitoes that transmit chikungunya breed in a wide variety of manmade containers which are common around human dwellings. These containers collect rainwater, and include discarded tyres, flowerpots, old oil drums, animal water troughs, water storage vessels, and plastic food containers. These breeding sites can be eliminated by:

- Draining water from coolers, tanks, barrels, drums and buckets, etc.
- Emptying coolers when not in use.
- Removing from the house all objects, e.g. plant saucers, etc. which have water collected in them
- Cooperating with the public health authorities in anti-mosquito measures.

CHIKF is generally not fatal. However, in 2005-2006, 200 deaths have been associated with chikungunya on Réunion island and a widespread outbreak in India[8]. It is recommended that acute CHIKF be monitored and managed in the same way as DF/DHF.

References

1. Centers for Disease Control and Prevention. Chikungunya Fever Fact Sheet. Available from: http://www.cdc.gov/ncidod/dvbid/Chikungunya/chickvfact.htm

2. Robinson MC. An epidemic of virus disease in southern province, Tanganyka Territory, in 1952-53: 1 Clinical features. *Trans Royal Society Trop Med Hyg* 1955; **49**:28-32.

3. Lumsden WHR (1955). "An Epidemic of Virus Disease in Southern Province, Tanganyika Territory, in 1952-53; II. General Description and Epidemiology". *Trans Royal Society Trop Med Hyg* 1955; **49**: 33-57.

4. Powers AM, Brault AC, Tesh RB, Weaver SC. Re-emergence of Chikungunya and O'nyong-nyong viruses: evidence for distinct geographical lineages and distant evolutionary relationships. *J Gen Virol* 2000; **81**:471-9.

5. World Health Organization. Chikungunya Fever, a re-emerging Disease in Asia. Available from: http://www.searo.who.int/en/Section10/Section2246.htm

6. Ravi V. Re-emergence of Chikungunya virus in India Guest Editorial. *Indian Journal of Medical Microbiology*, 2006; **24(2)**:83-4.

7. Lam SK, Chua KB. Alphaviruses. Available from: http://www.vadscorner.com/alphaviruses.html

8. Wikipedia, the free encyclopedia. Chikungunya. Available from: http://en.wikipedia.org/wiki/Chikungunya

9. Myers RM and Carey DE. Concurrent isolation from patient of two arboviruses, Chikungunya and dengue type 2. *Science* 1967; **157**:1307-8.

10. Brighton SW, Prozesky OW, De La Harpe AL. Chikungunya virus infection: a retrospective study of 107 cases. *S Afr Med J* 1983; **63**: 313-15.

11. Chatterjee SN, Chakravarti SK, Mitra AC, Sarkar JK. Virological investigation of cases with neurological complications during the outbreak of haemorrhagic fever in Calcutta. *J Indian Med Assoc* 1965; **45**:314-6.

12. Quatresous I. The Investigation Group, E-alert 27 January: Chikungunya outbreak in Réunion, a French 'overseas département'. Euro Surveill 2006;11: E060202. 1. Available from: http://www.eurosurveillance.org/ew/2006/060202.asp

G N Lucas
Joint Editor