Brief report

Chikungunya

Chief Epidemiologist, Epidemiological Unit, Department of Health Services

Since mid October 2006 there have been several reports to the Epidemiology Unit, Ministry of Health Sri Lanka of an increase in viral fever cases from numerous sources. These sources included some general practitioners from the Colombo district, mostly from the Colombo Municipal Council area, regional epidemiologists and physicians in the districts of Kalmunai, Mannar, Batticoloa, Trincomalee, Puttalam, Kurunegala and Jaffna. This viral fever was characterized by high fever, severe joint and muscle pain and a maculopapular rash. Arrangements were promptly made to send samples of blood from these patients for virological studies on dengue, measles and rubella to the Medical Research Institute (MRI), Colombo. Since the samples tested negative for these diseases it was decided to subject them to virological studies on Chikungunya which caused a recent outbreak in India. The samples were tested for Chikungunya at the MRI, the Molecular Medicine Unit of the Department of Microbiology at University of Kelaniya, the Gene-tech Research Institute Colombo, the Armed Forces Research Institute of Medicine (AFRIM) Laboratories of Thailand and the National Institute of Virology in Pune, India. More than 70% of the samples tested were positive for the chikungunya virus and, therefore, this outbreak of viral fever was attributed to the virus.

Chikungunya virus

The chikungunya virus (CHIKV) is a member of the genus *Alphavirus*, in the family *Togaviridae*. This virus was first isolated from the blood of a febrile patient in Tanzania in 1953, and has since been identified repeatedly in west, central and southern Africa and many areas of Asia, and has been cited as the cause of numerous human epidemics in those areas since then. The virus circulates throughout much of Africa, with transmission thought to occur mainly between mosquitoes and monkeys.

Chikungunya Fever

The Chikungunya virus causes chikungunya fever which is transmitted to humans by the bite of infected mosquitoes. The term 'chikungunya' comes from Makonde, the language of the ethnic group Makonde in the South Eastern part of Tanzania and Northern Mozambique. The word means 'that which bends up' a reference to the crippling nature of the illness.

CHIKV infection can cause an acute debilitating illness, most often characterized by fever, severe joint pain and rash. It is characterized by a rapid transition from a state of good health to the illness.

The **temperature** rises abruptly as high as 40^{0}C (typically in children) and is often accompanied with shaking chills. After a few days, fever may subside and rise again resulting in a saddle back fever curve.

The **arthralgia** is polyarticular and symmetrical involving knees, elbows, ankles, and small joint sites of previous injury. Pain is most intense on waking up in the morning. Chikungunya patients typically avoid movements as much as possible. Joints may swell without significant fluid accumulation. These symptoms may last from one week to several months and are accompanied by myalgia.

A **rash** characteristically appears on the first day of illness, but the onset may be delayed. It usually arises as a flush over the face and neck, which evolves to a maculopapular or macular form with pruritis. It later spreads to the trunk, limbs, palms and soles in that order of frequency. Petechial skin lesions can also be seen.

Other symptoms may include headache, photophobia, fatigue, nausea and vomiting. Haemorrhagic phenomena are relatively uncommon.

"Silent" CHIKV infections (infections without illness) do occur; but how commonly this happens is not yet known.

Chikungunya is rarely life threatening. The acute illness typically lasts a few days to a couple of weeks, but as with dengue, West Nile Fever, o'nyong-nyong fever and other arboviral fevers, some patients have prolonged fatigue lasting several weeks. Additionally, some patients have reported incapacitating joint pain, or arthritis which may last for weeks or months. The prolonged joint pain associated with CHIKV infection is not typical of dengue. Co-circulation of dengue fever in many areas may mean that chikungunya fever is sometimes clinically misdiagnosed as dengue infections; therefore, the incidence of chikungunya fevercould be much higher than what has been previously reported. CHIKV infection (whether clinical or silent) is thought to confer life-long immunity.

Geographic Distribution

Epidemics of illnesses resembling chikungunya have first been recorded from India as early as 1824. However after isolation of the virus in 1953

the disease has been reported from a wide geographic region from West Africa to the Philippines in Asia. It was reported from Sri Lanka from 1969.
Most recent outbreaks have been reported from India and various Indian Ocean islands including Comoros, Mauritius, Reunion and Seychelles.

Epidemiology of Chikungunya Fever
The incubation period can be 2-12 days, but is usually 3-7 days. CHIKV is spread by *Aedes aegypti* and *Aedes albopictus* mosquitoes. *Aedes aegypti*, a household container breeder and aggressive daytime biter which is attracted to humans, is the primary vector of CHIKV to humans. *Aedes albopictus* (the Asian tiger mosquito) may also play a role in human transmission in Asia, and various forest-dwelling mosquito species in Africa have been found to be infected with the virus. Monkeys and Baboons, the principal vertebrate hosts in the viral transmission cycle, develop viraemias after infection but remain asymptomatic. Possibly other wild animals, may also serve as reservoirs of the virus. Man is an accidental host.

Diagnosis
Suspected case: A patient presenting with acute onset fever usually with chills/rigors which lasts for 3 – 5 days with multiple joint pains/swelling of extremities that may continue for weeks to months.
Probable case: A suspected patient with the above features with any one of the following:
a) a history of travel or residence in areas reporting outbreaks
b) ability to exclude malaria, dengue and any other known cause of fever with joint pains
Confirmed case: Any patient with any one or more of following findings irrespective of the clinical presentation:
a) virus isolation in cell culture or animal inoculations from acute phase sera
b) Presence of viral RNA in acute phase sera
c) seroconversion to virus specific antibodies in samples collected at least 1 – 3 weeks apart
d) presence of virus specific IgM antibodies in a single serum sample collected after 5 days of onset of illness

Differential Diagnosis
Clinical manifestations of chikungunya fever have to be distinguished from dengue fever. Parvovirus infection, prodromal stages of hepatitis B, juvenile rheumatoid arthritis and rubella also have to be considered in the differential diagnosis.

Laboratory Diagnosis
Mild leucopenia and relative lymphocytosis, elevated ESR and positive C-reactive protein are seen. A reduction in platelet count and ECG changes may also be seen in complicated cases.
During the first 48 hours when the patients are viraemic, the virus is easily isolated in serum by RT PCR and culture. Antigen detection from ELISA is less sensitive. Antibodies can be detected from serum after five days from the onset of the illness.

Treatment
Chikungunya fever is not a life threatening infection. No vaccine or specific antiviral treatment for chikungunya fever is available. Treatment is symptomatic; rest, fluids, and paracetamol may relieve symptoms of fever and joint pain. Aspirin should be avoided during the acute stages of the illness. Convalescence can be prolonged (even up to a year or more) and persistent joint pain may require analgesic and long-term anti-inflammatory therapy.

Prevention
Chikungunya is transmitted by infected mosquitoes. Therefore the best way to prevent CHIKV infection is to avoid mosquito bites. There is no vaccine or preventive drug. Hence prevention strategies are similar to those for dengue fever:

- Avoid mosquito bites by using mosquito repellants, mosquito coils or protective clothing.
- Use mosquito nets to avoid mosquito bites whenever possible.
- Get rid of mosquito breeding sites where water can collect after rain. These usually are discarded tyres, plastic containers, leaf axils, coconut shells, blocked gutters, bird baths and flower vases.
- Additionally, a person with chikungunya fever should limit their exposure to mosquito bites in order to avoid further spreading the infection. The person must stay indoors or under a mosquito net.

Resources

1. World Health Organization Website http://www.searo.who.int/en/Section10/Section2246.htm
2. Centers for Disease Control and Prevention (CDC) , USA Website http://www.cdc.gov/ncidod/dvbid/Chikungunya/chickvfact.htm
3. Wikipedia, the free encyclopedia on chikungunya http://en.wikipedia.org/wiki/Chikungunya
4. John E Bennett, Raphael Dolin. Principles and Practices of Infectious Diseases 6th Edition; Vol. 2, pg 1913-1920
5. Douglas D Richman, Richard J Whitley, Fredrick G Hayden. Clinical Virology 2nd Edition; pg 1199-1201