CHIKUNGUNYA: ANOTHER EMERGING INFECTIOUS DISEASE IN THE U.S.
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December 2013
• First discovered in the Caribbean on Saint Martin.
• Previously reported in Africa, Europe, Asia and the Pacific
• First time the virus has been found among non-travelers in the Western Hemisphere.

Pan American Health Organization
• July 11, 2014
• Reported more than 355,000 suspected and confirmed cases of chikungunya fever from more than 20 countries or jurisdictions in the Americas
Countries and territories where chikungunya cases have been reported (as of July 22, 2014)

Countries and territories in the Americas where chikungunya cases have been reported* (as of July 22, 2014)

Countries and territories with laboratory-confirmed imported cases of chikungunya in the Americas, Dec 31, 2012
USA: 2006-2013

• 28 people per year (mean) in the United States with positive tests for recent chikungunya virus infection (Range 5–65 per year).
  • All were travelers visiting or returning to the United States from affected areas, mostly in Asia.

USA: 2014

• Cases have been identified in travelers returning from the Caribbean.
  – As of July 22, a total of 497 chikungunya cases have been reported to ArboNET from U.S. states and territories
  – 197 locally-transmitted cases have been reported from Florida, Puerto Rico, and the US Virgin Islands.
  – All other cases occurred in travelers returning from affected areas in the Caribbean and South America (N=295), the Pacific Islands (N=4), or Asia (N=1).
• Chikungunya: Not a nationally notifiable disease.
Chikungunya

• An RNA virus within the alphavirus genus of the Togaviridae family.
• First described during a 1952 outbreak in southern Tanganyika (now Tanzania).
• Makonde word (Tanzania): “that which bends up”
• Why? Patients are often stooped over in pain.

Transmission

• Chikungunya virus: Transmitted to people through mosquito bites.
  – Aedes aegypti
  – Aedes albopictus
  • Same mosquitoes that transmit dengue
• Mosquitoes become infected when they feed on a person with the virus.
• Infected mosquitoes then spread the virus to other people.

USA Susceptibility

• More than one-third of the United States has the warm to moderate climate necessary for the mosquito vectors, which are known to be “aggressive daytime biters.”
• Since the virus has largely been absent from the United States, there’s a huge population with little to no immunity.
U.S. mosquitoes

- Many of the US cases occurred in the 14 or more states that harbor the classic mosquito vector, *Aedes aegypti*
- Moreover, an even more tenacious vector mosquito, *Ae. albopictus*, has established itself in at least 32 states over the past three decades.

Modes of Transmission

- Through the bites of infected mosquitoes
  - predominantly *Aedes aegypti* and *Aedes albopictus*
- Humans: Primary host of chikungunya virus during epidemic periods.
- Blood-borne transmission possible;
- Rare: in utero transmission has been documented mostly during the second trimester.

Human-to-Human?

- Transmitted from mother to newborn around the time of birth.
- Rare
  - Not found in breast milk so far.
- The risk of a person transmitting the virus to a biting mosquito or through blood is highest when the patient is viremic during the first week of illness.
Transfusions?

- Theoretically, the virus could be spread through a blood transfusion.
- No known reports of this happening.

Last eight months

- 250,000 people in 22 countries and territories
- 15 cases in the U.S. territories of Puerto Rico and the U.S. Virgin Islands.
  - As of July 8 on the United States mainland, 138 cases have been reported from 30 states.
    - Travelers

Symptoms

- Incubation Period: 3-7 days
- Typically last about a week
- Acute onset of fever and prostration, muscle and joint pains
- Fever (typically >39°C [102°F]), rash and severe arthritis in one or more joints.
  - Symmetric arthralgias are usually prominent in phalanges, wrists, and ankles;
  - Rarely, pain can last for much longer
    - Can be debilitating
    - After 1 year, at least 20% of patients still have severe recurrent joint pains.
- Labs: lymphopenia, thrombocytopenia, elevated creatinine, and elevated hepatic transaminases.
- Frequently a nonspecific maculopapular rash that can be difficult to identify in dark-skinned patients.
Under the radar?

• Most people infected with chikungunya virus will develop some symptoms.

Complications

• Rare: uveitis, retinitis, myocarditis, hepatitis, nephritis, bullous skin lesions, hemorrhage, meningoencephalitis, myelitis, Guillain-Barré syndrome, and cranial nerve palsies.

• Persons at risk for severe disease include neonates exposed intrapartum, older adults (e.g., > 65 years), and persons with underlying medical conditions (e.g., hypertension, diabetes, or cardiovascular disease).

• Some patients might have relapse of rheumatologic symptoms (e.g., polyarthralgia, polyarthritis, tenosynovitis) in the months following acute illness.
  – Studies report variable proportions of patients with persistent joint pains for months to years.

Mortality

• The case fatality ratio is about 1 per 1000
• Most deaths occurring among
  – newborns,
  – the elderly,
  – the debilitated.
Differential Dx

• dengue,
• leptospirosis,
• malaria,
• rickettsia,
• group A streptococcus,
• rubella,
• measles,
• parvovirus,
• enteroviruses,
• adenovirus,
• other alphavirus infections (e.g., Mayaro, Ross River, Barmah Forest, O’nyong-nyong, and Sindbis viruses),
• post-infections arthritis,
• rheumatologic conditions.

Distinguishing CHIKV from Dengue

• Clinically: Chikungunya is distinguished from dengue by persistent or recurring polyarthralgias, which are uncommon in dengue
• Epidemiologically: By a low rate of asymptomatic infection
  – (as low as about 4%, vs. 50% or more with dengue).

Making the diagnosis

• Clinical: Based on the patient’s clinical features, places and dates of travel, and activities.
• Laboratory: Testing serum or plasma to detect virus, viral nucleic acid, or virus-specific immunoglobulin M and neutralizing antibodies
  – Test results are normally available 4 to 14 days after specimen receipt
Report!

- Report suspected chikungunya cases to state or local health department
- May facilitate diagnosis
- Mitigate the risk of local transmission.

High Risk Populations

- People at risk for severe disease
  - newborns infected around the time of birth,
  - adults age 65 and older
  - people with underlying medical conditions such as high blood pressure, diabetes or heart disease.

Immunity

- Once a person has been infected, he or she is likely to be protected from future infections.
Vaccine

• None

Treatment

• Over the counter (OTC) medications to relieve fever, arthritis and muscle aches.

Prevent mosquito bites

• Air conditioning
• Window and door screens
• Weekly, empty any standing water from containers like flower pots, buckets, and bowls
• Long-sleeved shirts and long pants
• Use insect repellents.
• Repellents: DEET, picaridin, IR3535, or oil of lemon eucalyptus (para-menthane-diol)
Best & Safest Repellents

- Use products containing active ingredients which have been registered with the U.S. Environmental Protection Agency (EPA) for use as repellents applied to skin and clothing.
  - Those containing DEET, picaridin, IR3535, and some oil of lemon eucalyptus and para-menthane-diol products provide longer-lasting protection.
  - EPA does not expect the product to cause adverse effects to human health or the environment when used according to the label.

Using Repellents

- Follow recommendations on product label.
- Apply repellents only to exposed skin and/or clothing
  - Not under your clothing.
- Don’t apply to eyes or mouth, paringly around ears.
- Face: Spray on your hands first and then apply to your face.
- Do not allow children to handle or spray the product.
  - When using on children, apply to your own hands first and then put it on the child.
  - Avoid applying repellent to children’s hands because children frequently put their hands in their eyes and mouths.
  - Products containing oil of lemon eucalyptus should not be used on children under the age of three years.
- No mosquito zone: Wash treated skin with soap and water or bathe.
- Get a rash or other reaction from a repellent: Stop using the repellent.
Pregnant or nursing women?

- EPA does not recommend any additional precautions for repellent use by pregnant or nursing women.

Clothing

- Permethrin
  - A repellent and insecticide. Certain products containing permethrin are recommended for use on clothing, shoes, bed nets, and camping gear.
  - Permethrin-treated products repel and kill ticks, mosquitoes, and other arthropods.
  - These products continue to repel and kill insects after several washings. Permethrin should be reapplied following the label instructions.
  - Permethrin-treated clothing available

If you have chikungunya

- First week of infection:
  - Chikungunya virus can be found in the blood
  - Can be passed from an infected person to another mosquito through mosquito bites. An infected mosquito can then transmit the virus to other people.
- Important for people to avoid mosquito bites during the first week of illness.
References

• CDC. Chikungunya http://www.cdc.gov/chikungunya/index.html