Case Report

The Chikungunya virus: An emerging US pathogen

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BACKGROUND: The Chikungunya (CHIK) virus was recently reported by the CDC to have spread to the United States. We report an early documented case of CHIK from the state of Pennsylvania after a patient recently returned from Haiti in June of 2014.

METHODS: A 39-year-old man presented to the emergency department complaining of fever, fatigue, polyarthralgias and a diffuse rash for two days. Four days before, he returned from a mission trip to Haiti and reported that four of his accompanying friends had also become ill. A CHIK antibody titer was obtained and it was found to be positive. During his hospital stay, he responded well to supportive care, including anti-inflammatories, intravenous hydration and anti-emetics.

RESULTS: His condition improved within two days and he was ultimately discharged home.

CONCLUSIONS: Manifestations of CHIK can be similar to Dengue fever, which is transmitted by the same species of mosquito, and occasionally as a co-infection. Clinicians should include Chikungunya virus in their differential diagnosis of patients who present with fever, polyarthralgia and rash with a recent history of travel to endemic areas, including those within the United States.

KEY WORDS: Chikungunya virus; Arbovirus; Mosquito-borne disease; Polyarthralgia

World J Emerg Med 2016;7(1):65–67
DOI: 10.5847/wjem.j.1920–8642.2016.01.012

INTRODUCTION

Throughout the summer, physicians now commonly consider mosquito-borne illnesses with various presentations. According to the United States Centers for Disease Control and Prevention (CDC), these vector-borne diseases have the potential to unpredictably sicken large numbers of people. The Chikungunya (CHIK) virus has recently arrived in the United States and continues to infect a growing number of patients. The first CHIK viral transmission on an American continent occurred in late 2013 in the Caribbean.^[1] We report an early documented case of CHIK from the state of Pennsylvania after a patient recently returned from Haiti in June 2014.

CASE REPORT

A 39-year-old man presented to the Emergency Department (ED) in June 2014 with a chief complaint of fever and polyarthralgias for two days. Additional

symptoms included fatigue, nausea and diffuse rash, which started at his abdomen and spread to his extremities. Four days before, he had returned from a ten-day mission trip to Haiti and four of his accompanying friends had also reportedly become ill with similar symptoms.

Patient's examination revealed an alert but generally ill appearing man. His vital signs were: temperature 102 °F, pulse 108, blood pressure 108/71 mmHg, respirations 20 breaths per minute, and oxygen saturation 100% on room air. His pupils were equally round and reactive to light and accommodation, and his sclera were non-injected and anicteric. His heart sounds were normal with tachycardia and respirations were unlabored with no wheezing, rales or rhonchi. His abdomen was soft, nontender and nondistended, and skin was warm and dry with a generalized maculopapular rash. His extremities and joints were non-tender. Neurologically, he displayed no deficits and was alert and oriented to person, place,

time and situation.

Diagnostic data included a normal chest X-ray and an electrocardiogram showing a normal sinus rhythm at 98 beats per minute with normal intervals and segments. Laboratory tests included a CBC revealing a white blood cell count 8.2 thou/cmm (normal 4.0–10.5 thou/cmm), hemoglobin 14.4 g/dL (normal 12.5–17.0 g/dL), hematocrit 42.0% (normal 37.0%–48.0%), red blood cell count 4.81 mill/cmm (normal 4.00–5.40 mill/cmm), and a platelet count 238 thou/cmm (normal 140–350 thou/cmm). His lactate was 1.4 mmol/L (normal 0.5–2.1 mmol/L). Coagulation studies revealed a PT 14.4 seconds (normal 12.0–14.6 seconds), PT/INR 1.1 and PTT 34.9 seconds (normal 21.6–35.6 seconds). His complete metabolic panel demonstrated sodium 132 mmol/L (135–146 mmol/L), potassium 4.3 mmol/L (normal 3.5–5.2 mmol/L), chloride 99 mmol/L (normal 96–109 mmol/L), carbon dioxide 27 mmol/L (normal 22–33 mmol/L), blood urea nitrogen 17 mg/dL (normal 10–26 mg/dL), creatinine 0.93 mg/dL (normal 0.70–1.50 mg/dL), calcium 8.7 mg/dL (normal 8.2–10.4 mg/dL) and glucose 102 mg/dL (normal 65–99 mg/dL). His liver enzymes were AST 30 U/L (normal 7–40 U/L), ALT 22 U/L (normal 21–72 U/L), alkaline phosphatase 59 U/L (normal 30–136 U/L), and total bilirubin level 0.5 mg/dL (normal 0.2–1.3 mg/dL).

In the ED, he was treated empirically with ceftriaxone 2GM and vancomycin 1GM, acetaminophen, ibuprofen, ondansetron and normal saline. He was admitted to the hospital with suspicion of CHIK viral infection, which was confirmed by antibody titers after consultation with an infectious disease specialist. Dengue fever was also heavily considered in the differential diagnosis, but serological testing was not ordered at the discretion of the specialist. During his hospital stay, he responded well to supportive care, including anti-inflammatories, intravenous hydration and anti-emetics. His condition improved over the course of two days and he was ultimately discharged home.

DISCUSSION

Chikungunya is a mosquito-borne disease caused by an RNA alphavirus of the *Togaviridae* family.^[1,2] The main mosquito vectors are the aggressive *Aedes aegypti* and *Aedes albopictus*.^[1,2] Past outbreaks of the virus have occurred in various countries in Africa, Asia and Europe, and along the Indian and Pacific Oceans, with the first known infection occurring in 1953 in Tanganyika.^[1,2]

CHIK has recently arrived in the United States in late 2013 and, with a growing incidence of afflicted patients,

has become a newly reportable infection 2015.^[3] Our patient was one of the first reported cases of the virus in the state of Pennsylvania and he had acquired his illness while travelling to Haiti. However, of more immediate interest, the first locally acquired case of CHIK was reported on July 17, 2014 in Florida, with ten more cases of local transmission subsequently reported in December 2014.^[4] These eleven newly reported cases represent the first time that mosquitoes in the United States are thought to have locally spread the virus to non-travelers.^[4,5] This brings recognition of the disease to a new level of importance.

The most common presentation of CHIK is acute onset of fever and polyarthralgia, sometimes followed by a maculopapular rash.^[1,2,5–7] Other associated symptoms can include headache, myalgia, nausea and vomiting.^[1,5,6] These symptoms typically occur three to seven days after the mosquito bite and generally last seven to ten days.^[1,2,5–7] This is often after most travelers return home. Rare complications of CHIK can include uveitis, retinitis, myocarditis, hepatitis, nephritis, bullous skin lesions, hemorrhage, meningoencephalitis, myelitis, Guillain-Barre syndrome and cranial nerve palsies.^[1]

The clinical manifestation of CHIK can be very similar to Dengue fever, which is transmitted by the same species of mosquito, often in the same endemic areas.^[1,2,6,8] The two viruses can even be transmitted together as a co-infection.^[1,6] Patients infected with CHIK are more likely to experience symptoms of high fever, severe polyarthralgia and rash with *lymphopenia*, whereas patients with Dengue fever are more likely to have symptoms of hemorrhage, shock and death with associated laboratory derangements of neutropenia and thrombocytopenia.^[1,2,6] However, because of the close similarities, Dengue fever should be strongly considered in the differential diagnosis of patients with suspected CHIK.^[1,8]

Confirmational testing for CHIK can be performed in one of the three ways. These methods include viral culture if tested within the first three days of the illness, PCR in the first eight days, or antibody serology, as in the above case, after the first three days of illness.^[1,6,7] Other laboratory abnormalities may include lymphopenia, thrombocytopenia, elevated creatinine and elevated hepatic transaminases.^[1,2] Treatment is primarily supportive.^[1,2]

In conclusion, clinicians should now include Chikungunya virus in their differential diagnosis of patients who present with fever, polyarthralgia and rash. Even without a recent history of travel, the disease has now been documented within the United States,

including Florida. The clinician should also be advised to cautiously evaluate and treat these patients, as exclusion of more serious illnesses is necessary and appropriate.

Funding: None.

Ethical approval: Not needed.

Conflicts of interest: The authors declare that no competing interest and no personal relationships with other people or organizations that could inappropriately influence their work.

Contributors: Nappe TM proposed the study and wrote the first draft. All authors read and approved the final manuscript.

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Received January 21, 2015

Accepted after revision May 18, 2015