



> THE PATIENT

30-year-old woman

> SIGNS & SYMPTOMS

- Severe polyarthralgia
- High-grade fever (102.6° F)
- Diffuse maculopapular rash on trunk and extremities

CASE REPORT

ONLINE EXCLUSIVE

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> THE CASE

A 30-year-old woman presented to our emergency department with severe polyarthralgia, a high-grade fever (102.6° F), and a diffuse maculopapular rash on her trunk and extremities. She had returned from her honeymoon in Jamaica 6 days earlier. During her time there, she ate local cuisine, hiked in the jungle, and was bitten by many mosquitoes. The patient was nauseous, and had been experiencing headaches, generalized weakness, and fatigue. Her physical exam revealed a maculopapular rash on her trunk and upper extremities. She had tenderness and pain, as well as decreased range of motion in her ankles, knees, and wrists. The patient had no erythema, swelling, petechiae, or bruising. She had a past medical history of Graves' disease and had received all of her childhood immunizations.

THE DIAGNOSIS

Our lab work-up included a complete blood count, liver function tests, blood pathogens for malaria, and serologic tests for dengue fever, measles, mumps, rubella, Lyme disease, human immunodeficiency virus (HIV), and parvovirus. We ruled out dengue fever because the patient had no evidence of hemorrhage, thrombocytopenia, rising hematocrit, or neutropenia. HIV antibody screening tests were performed, although, in retrospect, confirmatory HIV quantitative RNA testing should've been obtained because of the acute nature of the patient's symptoms. Regardless, the work-up was negative, with the exception of a positive parvovirus immunoglobulin G (IgG).

Given our patient's travel history, unremarkable lab results, and physical exam (notably the rash and joint pain), we suspected that she was infected with the chikungunya virus and tested for it. The results of chikungunya serum titers returned 13 days later and were positive for both immunoglobulin M (IgM) and IgG, confirming our suspicion.

DISCUSSION

Chikungunya is a viral infection that is most commonly transmitted to humans via mosquitoes. The infection was first identified in West Africa in the mid-1900s and predominantly occurs in tropical and subtropical regions due to the numbers of mosquitoes in those areas. Since 2000, outbreaks have been most common in Africa and Asia, with the largest outbreaks occurring from 2005 to 2006.^{1,2} Chikungunya has since become more widespread in the Indian Ocean islands, and in 2013, it was first identified in the Caribbean islands. As of March 2017, over one million cases have been reported in the Americas, according to the Pan American Health Organization.³ In 2014, 12 locally transmitted cases were reported in Florida.⁴

The most common mosquito vectors for chikungunya are the *Aedes albopictus* (Asian tiger mosquito) and *Aedes aegypti* mosquitoes. These mosquitoes also transmit dengue fever, yellow fever, and Zika virus. Both of these mosquitoes are well-adapted to urban areas

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and can breed in standing water. *A. aegypti* mosquitoes are found only in the southern United States, while *A. albopictus* mosquitoes can be found in more temperate climates—areas like New York, New Jersey, and Pennsylvania.⁴ Both species are daytime biters, so their activity peaks during the dawn and dusk periods. Because local mosquito vectors exist as far north as New York, local transmission and outbreaks are possible in many parts of the United States.

When to suspect chikungunya, and what to look for

Suspect chikungunya in patients returning from endemic areas. After a 3- to 7-day incubation period, the clinical presentation of chikungunya typically begins with fever and malaise, followed by polyarthralgia that starts 2 to 5 days after the onset of fever. Headache, nausea, and conjunctivitis may also occur. Polyarthralgia and arthritis usually present in symmetrical distal joints and are accompanied by face and trunk flushing that is followed by a maculopapular rash. The rash predominantly appears on the trunk and limbs, but can also occur on the face, palms, and soles. Tendons and ligaments—especially the Achilles tendon—may become inflamed, as well. Symptoms typically resolve within 2 to 3 weeks, although polyarthralgia may last for months or even years.

There is no known risk of transmission through breast milk or in utero, although vertical transmission through vaginal or cesarean birth is common in viremic women. Blood-borne transmission can occur in the laboratory, nosocomially, or through the transfusion of blood products if exposure occurs during the early viremic phase.^{1,2} Dual infections are possible (typically with yellow fever, malaria, Zika virus, or dengue fever) and should be considered based on the patient's travel history.⁵ Abnormal laboratory findings are less common, but may include lymphopenia (most common), thrombocytopenia, elevations in blood urea nitrogen and creatinine (indicating an acute kidney injury), and elevated liver transaminases.

Chikungunya is generally considered a self-limiting disease, but severe atypical

manifestations can lead to meningoencephalitis, respiratory failure, and even death. Severe disease is more commonly seen in infants, patients over age 65 years, and in those with chronic medical conditions.

■ **The differential diagnosis for chikungunya virus** includes dengue fever, Zika virus, malaria, measles, rubella, parvovirus, primary HIV infection, Lyme disease, and other inflammatory joint conditions. The differential depends on where a patient lives, their travel history, and exposures.

Dengue and chikungunya have similar features, which often make them difficult to distinguish. However, patients with dengue fever present more often with neutropenia, thrombocytopenia, and signs or symptoms of shock or hemorrhage.⁶ The chikungunya rash is typically a maculopapular rash on the trunk, hands, and feet that appears within the first 2 days of illness, as opposed to dengue, which has a similar rash, but appears later in the disease (Days 2-5). Avoid nonsteroidal anti-inflammatory drugs (NSAIDs) if dengue fever is suspected, as they can worsen hemorrhaging.⁷

Zika virus typically presents with milder symptoms compared to chikungunya. Patients may have a skin rash and occasionally, conjunctivitis, but limited high fevers or joint pain. Zika rash is maculopapular, but typically starts on the face on the first day of the illness. Zika has been associated with neurological complications such as Guillain-Barré syndrome and microcephaly in fetuses of infected pregnant woman.⁸

Choice of testing modality depends on when symptoms began

Laboratory diagnosis of chikungunya can be accomplished 3 ways: viral culture, reverse transcriptase-polymerase chain reaction (RT-PCR) viral RNA, and serology.¹ The choice of which modality to use depends on the time between the onset of symptoms and the date on which a serum sample is drawn.

- **If the patient presents within the first 3 days of illness**, viral culture can detect chikungunya. Chikungunya virus testing is available through the Centers for Disease Control and Pre-

vention (CDC), some state laboratories, and one commercial lab.⁸ Viral cultures are considered the gold standard for diagnosis, but a requirement for an elevated biosafety level, as well as a longer incubation time, make them less useful in the clinical setting.^{1,9}

- **If symptoms started less than 5 to 8 days prior**, serum should be sent for RT-PCR for viral RNA.
- **If symptoms occurred more than 8 days prior**, serum should be sent for IgM and IgG serologic testing.

If the acute sample was negative (and chikungunya is still suspected), a second serum sample should be drawn 2 to 3 weeks later during the convalescent phase and sent for IgG serologic testing.

■ **There are no specific treatments or vaccines available** for chikungunya, but both live and inactivated vaccines are being tested. To prevent chikungunya virus infection, advise patients traveling to endemic areas to reduce mosquito exposure by avoiding outdoor activities during dusk and dawn, wearing long-sleeved shirts and long pants, and using an insect repellent that contains

DEET. Recommend that patients who will be sleeping in a high-risk area use bed netting treated with permethrin. The CDC Web site has excellent additional information, available at <http://www.cdc.gov/chikungunya>.¹⁰

■ **Our patient** was briefly hospitalized due to intractable pain. She was discharged after 2 days and given prescriptions for motrin 800 mg and percocet 5/325 mg for breakthrough pain. Her wrist and ankle pain persisted after discharge, but slowly resolved after 2 to 3 months.

THE TAKEAWAY

Chikungunya is becoming more common among travelers returning to the United States from the Caribbean islands, and mosquito vectors found in parts of the United States are enhancing the possibility of local outbreaks. Travel to endemic regions—and the classic symptoms of fever, polyarthralgia, and a maculopapular rash—should lead you to put chikungunya high on the differential. Chikungunya is considered a reportable disease and treatment is largely supportive. Co-infections are possible and should be considered based on the patient's travel history.

JFP

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