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Chikungunya: A disease risk for Canadians traveling in the tropics

A recent case of chikungunya fever demonstrates why physicians need to make an early diagnosis, provide effective symptomatic treatment of the severe myalgias and arthralgias that can result, and educate patients about preventing mosquito-borne illness.

ABSTRACT: While vacationing in Mexico a 68-year-old man developed a generalized rash and low-grade fever and fatigue for 1 week. On returning to Canada he experienced a flare-up of pain in his neck, elbows, wrists, and knees, and developed pain and numbness in both arms. The symptoms responded minimally to naproxen and improved dramatically with prednisone. Exposure to chikungunya, an RNA alphavirus of the Togaviridae family, was suspected. Subsequently, a reactive IgM enzyme immunoassay confirmed exposure to chikungunya. The patient has now returned to mostly normal levels of functioning and has only mild residual numbness in his right thumb. With so many Canadians traveling to tropical areas, physicians must remain aware of the risk posed by mosquito-borne illnesses. Severe chikungunya fever can manifest as encephalitis, myocarditis, hepatitis, arthritis, and multiorgan failure. Neurological complications can include seizures, encephalopathy, neuropathy, and Guillain-Barré syndrome. Patients older than 65 and young children, particularly newborns, are at increased risk for severe disease. Distinguishing chikungunya fever from dengue fever is critical because only the latter can lead to life-threatening hemorrhagic disease. Since the spring of 2014, there have been 320 confirmed cases and 159 probable cases of chikungunya infection in Canada. Canadians traveling to tropical areas should be advised to protect themselves against exposure to mosquito bites. Precautions include using mosquito repellant at all times, sleeping under a mosquito net, and wearing long-sleeved shirts and long pants.

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Case data

In November 2015 a previously healthy 68-year-old physician vacationing in Mexico developed a generalized rash and low-grade fever and fatigue for 1 week. With the exception of bilateral osteoarthritis of the knees, the patient had no pre-existing medical concerns. On returning to Canada his symptoms abated, but by mid-December he had a flare-up of pain in his neck, elbows, wrists, and knees. He developed pain and numbness in both arms that was intermittent and depended upon sleeping position. The pain resulted in significant sleep disturbance. Arm strength was significantly reduced and he was unable to open twist-top bottles. His personal trainer noted a loss of strength in the upper body of approximately 75%. Lifting cooking pots and tying shoelaces was difficult.

Over the Christmas holidays the patient found he could no longer

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bicycle because of pain in the wrists and weakness in the hands that made braking impossible. Because of joint swelling, rings had to be removed and a watch strap considerably loosened.

The patient's family physician was concerned about viral infection. A referral to neurology and electromyography studies confirmed severe bilateral carpal tunnel syndrome. There was also evidence of a right-sided C7 radiculopathy. No specific cause was identified for the neuropathy. An urgent MRI of the neck was ordered, resulting in an appointment date 9 months later. The patient elected to obtain an MRI privately and the imaging was completed within 48 hours. The MRI of the neck revealed degenerative changes and foraminal narrowing at multiple levels. There was mild stenosis in the spinal canal at C4-C5 and severe right and moderately severe left foraminal stenosis.

In late December the patient began taking naproxen (220 mg Q.I.D.) to minimal effect and was referred to a rheumatologist in early January. Based on the patient's history, infection with chikungunya virus (CHIKV) was suspected. Treatment with prednisone (5 mg B.I.D.) led to a dramatic and early resolution of symptoms. Physiotherapy was arranged through the local hospital. Laboratory test results were unremarkable, with the exception of a CRP level of 20.6 mg/L (reference range 0.08–3.1 mg/L), which fell to 0.6 mg/L after treatment with prednisone. Subsequently, a reactive IgM enzyme immunoassay confirmed the presence of chikungunya antibodies. Results from testing for Zika virus were negative.

The patient has now returned to mostly normal levels of functioning with mild residual numbness in the right thumb. The pre-existing osteoarthritis in both knees has stabilized or improved, likely as a result of physiotherapy.

Chikungunya is an RNA alphavirus of the Togaviridae family that can cause chronic and incapacitating arthralgia in humans.

Discussion

With so many Canadians traveling to tropical areas, physicians must remain aware of the risk posed by mosquito-borne illness, which is increasing around the world. It is important to educate patients, to make an early diagnosis, and to provide effective symptomatic treatment when required.

A growing body of evidence indicates that viruses and other infectious agents play a role in chronic, inflammatory arthritides such as rheumatoid arthritis.[1] More than 30 microorganisms known to result in significant joint inflammation have been identified, including chikungunya virus. Usually viral arthritis is self-limiting and lasts from a few weeks to several months.

Chikungunya

Chikungunya is an RNA alphavirus of the Togaviridae family that can cause chronic and incapacitating arthralgia in humans. CHIKV was first isolated in Tanzania in 1952. Since then there has been worldwide spread. Chikungunya has now been identified in more than 60 countries and is considered an important re-emerging public health problem in both tropical and temperate regions. The virus is spread by mosquitoes, typically *Aedes aegypti* or *Aedes albopictus*, the same mosquitoes that spread dengue fever and Zika virus disease.[2-4]

In December 2013 the first locally acquired CHIKV infections in the Americas were identified in the Caribbean,[5,6] and by May 2014 almost 60 000 cases had been reported and the outbreak was still spreading.[4] In Canada, 320 confirmed cases and 159 probable cases had been diagnosed as of December 2014.[7] CHIKV has since been reported in many regions of Africa, the Americas, Asia, and the Pacific islands. The United States had 2320 imported cases as of 8 January 2015, and in that year chikungunya became a nationally notifiable condition and jurisdictions are now required to report all cases to the Centers for Disease Control and Prevention.

Diagnosis

The incubation period for CHIKV is 1 to 12 days. The acute phase of the

disease is characterized by the rapid onset of fever and intense asthenia, arthralgia, myalgia, and headache, with maculopapular rash occurring in 40% to 50% of cases. Following the rash, severe myalgias and arthralgias can be so intense that patients have difficulty changing position. The joint pain is typically symmetrical and located in both the arms and legs. Small joints in the vertebral column can be involved to a lesser extent.

Severe chikungunya fever can manifest as encephalitis, myocarditis, hepatitis, and multiorgan failure. Neurological complications can include seizures, encephalopathy, neuropathy, and Guillain-Barré syndrome.

Patients older than 65 and young children, particularly newborns, are at increased risk for severe disease.

Distinguishing chikungunya fever from dengue fever is critical because only the latter can lead to life-threatening hemorrhagic fever, which requires hospitalization of the patient.

Laboratory evidence of recent exposure to chikungunya, dengue, or Zika virus is confirmed by testing serum to detect viral nucleic acid or virus-specific immunoglobulin.

Treatment

There is no specific antiviral therapy for CHIKV infection. Treatment is symptomatic and can include rest, fluids, and the use of nonsteroidal anti-inflammatory drugs (NSAIDS) to relieve acute pain and fever. Persistent joint pain may benefit from the use of NSAIDS, corticosteroids, or physiotherapy.

Prevention

Currently there are no licensed vaccines for use against CHIKV, although numerous candidates are being studied. Specific medications for treating CHIKV infection are also not available.

Prevention and control of chikungunya disease involves insecticidal spraying and management of mosquito breeding sites, as well as bite prevention. Canadians traveling to any tropical area should be informed of the significant risk of mosquito-borne illness and advised to take the following precautions:

- Use mosquito repellant at all times.
- Use air conditioning to stay cool and window or door screens to keep mosquitoes outside.
- Consider sleeping under a mosquito net.
- Empty standing water from containers such as flowerpots and buckets.
- Wear long-sleeved shirts and long pants.
- When using sunscreen and insect repellant together, apply the sunscreen first.
- Treat clothing with permethrin or purchase permethrin-treated clothing.
- Avoid exposure at peak biting times, dawn and dusk (*Aedes aegypti* is a day-biting mosquito species).

The Centers for Disease Control and Prevention website is a good source of additional up-to-date information: www.cdc.gov/chikungunya.

Summary

The case of a 68-year-old patient who recovered after contracting chikungunya fever in Mexico shows the risk posed by mosquito-borne illness. Chikungunya can cause intense asthenia, arthralgia, myalgia, headache, and maculopapular rash. Patients older than 65 and young children are at increased risk for severe disease. Distinguishing chikungunya fever from dengue fever is critical. There are no licensed vaccines for use against CHIKV and no medications for treating chikungunya disease specifically. With so many Canadians traveling to tropical areas, physicians must educate patients about protecting themselves from mosquito bites and provide effective symptomatic treatment when required.

Competing interests

None declared.

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