

Case Report

A case of chikungunya virus disease presenting with remarkable acute arthritis of a previously damaged finger joint

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Abstract

Chikungunya virus (CHIKV) is a mosquito-borne arthritogenic alphavirus that has recently been introduced to Brazil. We report the case of a 36-year-old male patient from the City of Rio de Janeiro who developed molecularly-confirmed CHIKV disease and whose clinical picture was remarkable because of acute arthritis of an interphalangeal joint that had been damaged by trauma 8 years previously. This case illustrates that acute CHIKV disease may preferentially target previously damaged joints. Careful study of individual cases may provide valuable information on the presentation and management of this emerging zoonosis in Brazil.

Keywords: Arthritis. Chikungunya. Trauma.

INTRODUCTION

Acute and chronic arthritis may be triggered by a wide variety of infectious agents through infective/septic, reactive, or inflammatory mechanisms⁽¹⁾. Among these agents, arthritogenic alphaviruses are gaining emerging importance because of unprecedented outbreaks of chikungunya virus (CHIKV) infection that have swept different continents since 2004⁽²⁾. Alphaviruses are a genus of enveloped, positive sense, single-stranded ribonucleic acid (RNA) viruses that are generally transmitted by arthropod vectors. Together with *Rubivirus* (whose sole member is rubella virus), alphaviruses belong to the *Togaviridae* family⁽³⁾. Alphaviruses are generally divided into *Old World* viruses, which are mainly associated with rheumatic disease, and *New World* viruses, which are mainly associated with encephalitic disease. This phylogenetic classification, however, does not fit the actual geographic distribution of alphaviruses. For example, Mayaro virus is an arthritogenic alphavirus that occurs in South America⁽³⁾. Likewise, the distribution of Ross River virus, another arthritogenic alphavirus, is limited to Australia and Oceania⁽³⁾. Symptomatic infection of adults with so-called *Old World* alphaviruses is nearly always associated with rheumatic manifestations, primarily polyarthralgia and

polyarthrititis, which can be chronic and debilitating⁽¹⁾⁽²⁾⁽³⁾. The pathogenesis of the arthropathy is believed to be attributable to the presence of residing or replicating viruses or their products in joint tissues, notably synovial macrophages⁽¹⁾⁽²⁾⁽³⁾.

CHIKV is transmitted by the bite of infected mosquitoes (*Aedes [Stegomyia] aegypti* and *Aedes [Stegomyia] albopictus*). The name *chikungunya* means *to become contorted* in the Makonde language, which is spoken in Austral Africa, where CHIKV was first identified⁽⁴⁾. CHIKV was introduced to the Americas in 2013 and, since September 2014, autochthonous cases have been confirmed in Brazil, with at least two genotypes circulating in the country⁽⁵⁾⁽⁶⁾⁽⁷⁾. An imported case had previously been reported in Rio de Janeiro in 2010⁽⁸⁾.

Here, we report a case of CHIKV infection with a clinical picture that was remarkable because acute arthritis preferentially affected a previously damaged finger joint.

CASE REPORT

In March 2016, a 36-year-old, previously healthy man developed an explosive onset of high fever (>39°C), chills, conjunctivitis, and a severe, debilitating polyarthralgia affecting the proximal interphalangeal (PIP), metacarpophalangeal, and metatarsophalangeal joints, as well as the wrists, shoulders, and ankles. He had experienced generalized morning stiffness when he woke up that morning. His symptoms worsened over the course of a few hours to the point that he had to ask his wife to pick him up by car at his place of work. The patient resided in the City of Rio de Janeiro, where he had been born.

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On the third day of illness, physical examination showed the remarkable finding of marked tenderness and arthritis of the third left PIP joint (**Figure 1A**). There was a history of trauma to that finger 8 years previously and a boutonnière deformity was evident. Despite diffuse arthralgias, no other hand joint had signs of arthritis. Painful swelling of the feet was also noted (**Figure 1B**). A mild, evanescent, and blanchable maculopapular rash affected his trunk.

Laboratory evaluations were unremarkable and an immunoglobulin M (IgM) serology for dengue virus infection was negative. Supportive treatment was offered with fluids, rest, and non-steroidal anti-inflammatory agents. Over the ensuing 7 days he also reported episodes of diarrhea, nausea, and vomiting. Striking pain in the third left PIP joint persisted for weeks and dominated the clinical picture. X-rays of the left hand (**Figure 1C and D**) performed 1 month after presentation showed an old fracture of the proximal phalanx of the middle finger, a boutonnière deformity, and evidence of osteoarthritis, including areas of calcification, osteophyte formation, and erosions.

Blood collected on the third day of illness was sent for molecular analyses targeting the amplification of both CHIKV and Zika virus (ZV) nucleic acid sequences. Real-time reverse transcription polymerase chain reaction yielded negative results for ZV and positive results for CHIKV. Therefore, a diagnosis of acute CHIKV disease was made. Two months after presentation, there was partial resolution of the PIP arthritis. Significant arthralgia, however, persisted.

Informed consent

Informed consent was obtained from the patient for the publication of this case report.

DISCUSSION

Arthropod-borne viruses may cause severe emerging and re-emerging infectious diseases and pose a significant global public health threat. When our patient first presented, Brazil was facing concomitant epidemics of dengue, Zika, and CHIKV disease⁽⁷⁾. CHIKV disease shares a close resemblance with classical dengue fever and Zika virus infection. However, prominent rheumatological findings may suggest a diagnosis of CHIKV. Co-infections among these viruses may also occur. A prompt diagnosis of these arbovirus diseases is of utmost importance in areas where competent vectors are present. Therefore, availability of widely accessible diagnostic tests is an urgent need. In the present case, rapid access to a reference research laboratory allowed a molecular diagnosis of CHIKV to be made during the brief viremic period.

The hallmark of our patient's presentation was severe acute arthritis in a finger joint previously damaged by trauma. Few similar clinical observations have been published. In a case series from Marseilles, France, it was noted that five out of 47 patients developed asymmetric arthralgia in joints previously damaged by trauma or surgery⁽⁹⁾. Axial pain was also more



FIGURE 1. (A): Marked arthritis of the PIP joint of the middle left finger, as seen on the third day of illness. (B): Bilateral feet edema, which was more pronounced on the right. (C): X-ray image of the left hand (oblique view) showing an old fracture of the proximal phalanx and osteoarthritis with joint space loss, areas of calcification, erosions, and osteophyte formation. (D): Lateral view showing a boutonnière deformity with areas of calcification on the insertion of the central slip (extensor apparatus) and on the volar plate. (E): Partial resolution of PIP arthritis 2 months after presentation. PIP: proximal interphalangeal.

common in patients with previous arthritis⁽⁹⁾. Our patient's dramatic finger arthritis highlights the tendency of acute CHIKV disease to target previously damaged joints.

A notable clinical feature of chikungunya is the persistence of joint symptoms for weeks to months, including a syndrome of post-chikungunya chronic inflammatory rheumatism⁽¹⁰⁾. Among patients recruited from the outbreak on Reunion Island, older age, severity of presentation, and CHIKV-specific immunoglobulin G (IgG) titers were predictors of persistent symptoms⁽¹¹⁾. Host inflammatory response, as well as virus persistence and virulence, are probably involved in alphavirus-induced joint damage.

CHIKV disease may also present with a variety of dermatological, neurological, ophthalmological, and myocardial complications, among others⁽¹⁾⁽²⁾⁽³⁾. As our knowledge of the full clinical spectrum of this highly debilitating infection develops, careful study of individual case reports and case series may provide information that is valuable to its medical management.

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Conflicts of Interest

The authors declare that there is no conflict of interest.

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