Case Report

First report of Chikungunya virus infection in Nepal

Sher Bahadur Pun, Anup Bastola, Rajesh Shah

Sukraraj Tropical and Infectious Disease Hospital, Kathmandu, Nepal

Abstract

Chikungunya virus is an emerging arboviral disease that has been spreading rapidly across south Asia in recent years. Until recently, no chikungunya cases have been reported in Nepal. For the first time, we report three cases of chikungunya virus infection in Nepal

Key words: first report; Chikungunya; Nepal

J Infect Dev Ctries 2014; 8(6):790-792. doi:10.3855/jidc.3701

(Received 19 April 2013 – Accepted 15 July 2013)

Introduction

Chikungunya fever is an arboviral disease caused by chikungunya virus (CHIKV) that belongs to the genus *Alphavirus* in the family *Togaviridae*. CHIKV is transmitted to humans primarily by the bite of an infected *Aedes aegypti* mosquito. CHIKV illness is characterized by fever, headache, fatigue, body ache, rash, occasional neurologic disease, and joint pain. Persistent joint pain is the hallmark of CHIKV infection [1].

CHIKV was first reported in febrile patients following an outbreak in 1953 in Tanzania [1]. In the past few years, CHIKV has been reported more frequently in south Asia, particularly in India. In 2005-2006, a total of 129 districts in eight states of India have been affected by CHIKV, and millions of chikungunya fever cases are believed to have occurred during that period [2]. Nepal shares an open border of more than 1,800 km with India, which poses a potential threat of transmission of vector-borne diseases between India and Nepal due to similar climates and cross-border population movement. More recently, several outbreaks of dengue fever have been observed in Nepal [3], and these viruses were found to be genetically similar to those of strains isolated in India [4]. Co-circulation of both dengue virus (DENV) and CHIKV have been reported at regular intervals in India over the last few years [5]. The *Ae. aegypti* mosquito, the main vector of CHIKV and DENV, has already been reported in Nepal, though chikungunya cases have not yet been ascertained. For the first time, we present three cases of CHIKV infection in Nepal.

Case Reports

Case 1

In March 2013, a 20-year-old previously healthy male from Dhading district presented to the outpatient department of Sukraraj Tropical and Infectious Disease Hospital, Kathmandu, Nepal, with a four-month history of severe lower extremity pain associated with generalized muscle pain and fatigue. The patient had a past history of fever (> 102°F) associated with headache, generalized body ache, and joint pain, but without the appearance of skin rashes, about four months ago. The patient's clinical outcome was improved one week after empirical treatment but his lower joint pain persisted until the present. He had no history of travel to India or known CHKV affected areas. Laboratory tests at the time of presentation showed a total leukocyte count of 7,200/mm^3 with 46% neutrophils, 46% lymphocytes, 8% eosinophils, and 2% basophils. His hemoglobin was 17.4 g/dm3, and his thrombocyte count was 49,000/mm^3. Immunochromatographic assays for DENV (PanBio, Brisbane, Australia) and CHIKV (Millennium Biotechnology, Inc., Paramus, USA) were performed. A serum sample obtained from a healthy volunteer without any signs or symptoms of CHIKV/DENV was also included as a negative control. The patient tested positive for the IgG antibody to CHIKV. Both IgM and IgG antibodies against dengue virus and Widal agglutination tests were negative. On the basis of clinical presentations and laboratory findings, a diagnosis of CHIKV infection was made, and the patient was treated with a non-steroidal anti-

inflammatory drug (NSAID), nimesulide, for pain relief.

Case 2

On 22 May 2013, a 38-year-old male presented to the outpatient department of Sukraraj Tropical and Infectious Disease Hospital owing to severe retro-orbital pain and sore throat associated with mild fever, headache, muscular pain, and joint pain of both upper and lower limbs. Respiratory, cardiovascular, gastrointestinal, and nervous systems were unremarkable on physical examination. No skin rash was observed. He had a history of travel to Dhading district 10 days ago. Blood tests showed a leukocyte count of 10,000/mm^3 with 83% of neutrophils, 75% of lymphocytes, and 2% of eosinophils; 14.8/dm3 of hemoglobin and platelets of 200,000/mm^3 were found. Blood cultures and a serological test for the malaria parasite were negative. Immunochromatographic tests for DENV (Panbio, Brisbane, Australia) and CHIKV (Millennium Biotechnology, Inc., Paramus, USA) were performed. Tests for IgM and IgG antibodies against dengue virus were negative, while the test for the IgM antibody to CHIKV was positive. Diagnosis of CHIK fever was made based on clinical features, laboratory findings, and travel history to Dhading district. The patient was treated with an NSAID, azithromycin, and an antihistamine. The patient recovered completely, although his joints remained painful until his last follow-up visit.

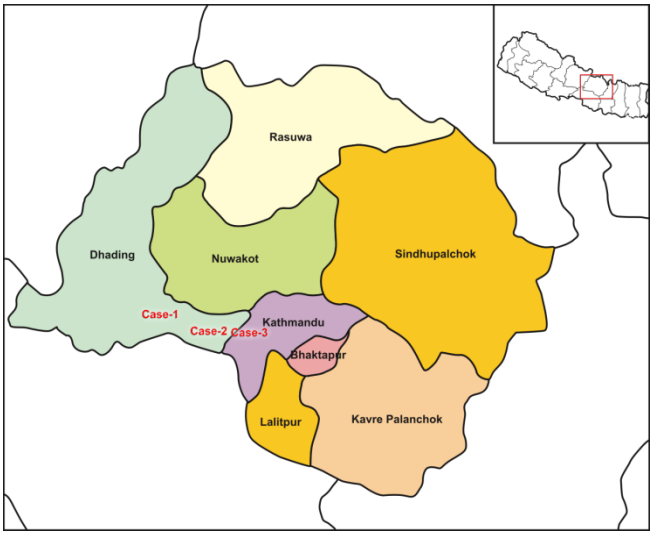
Case 3

On 2 June 2013, a 43-year-old previously healthy male presented to the outpatient department of Sukraraj Tropical and Infectious Disease Hospital with chief complaints of severe lower extremity pain, wrist joint pain, and stiffness, without signs of inflammation associated with fever, myalgia, severe retro-orbital pain and fatigue over the past seven days. The patient also complained of transient peripheral neuropathy such as muscle weakness, tingling sensation, pins and needles, and numbness in his right arm and leg. There was no history of rash. Examinations of his respiratory, cardiovascular, and abdominal systems were unremarkable. The patient had taken Paracetamol and Brucet (ibuprofen and paracetamol), but these did not provide significant relief from severe joint pain. The laboratory investigations revealed total leukocyte count 10,000/mm^3 with neutrophils 79%, lymphocytes 17%, and eosinophils 4%, an erythrocyte sedimentation rate (ESR) of 36 mm in one hour, platelet count of 279,000/mm^3, and hemoglobin of 9.0/dm3. The liver function test was within the normal range. Blood and urine cultures were negative. The malaria parasite was not detected by microscopic examination of peripheral blood smears. IgM and IgG antibodies against DENV were negative by immunochromatographic test (Panbio, Brisbane, Australia), while the CHIKV-specific IgG antibody (Millennium Biotechnology, Inc., Paramus, USA) was positive. The patient was diagnosed with CHIKV infection based on clinical features and laboratory findings. The patient was treated with an anti-analgesic drug for pain relief. Muscle weakness of the right arm and leg showed a remarkable improvement at the follow-up visit one week later, though no sign of significant improvement in pain relief was observed.

Discussion

Over the past few years, Nepal has been experiencing an epidemic of fever; most febrile illnesses resolve before the correct diagnosis can be made. Most physicians believe that patients with acute fever could have either typhoid fever or other bacterial/viral fevers, and hence treat patients empirically with antibiotics. However, the occurrence of multiple outbreaks of dengue fever in 2006 and 2010 has compelled physicians to include dengue in the differential diagnosis when a patient presents with acute fever [3]. CHIKV has gained considerable attention in Nepal's neighboring country, India, due to the increasing number of outbreaks in recent years. However, physicians currently do not consider CHIKV in the differential diagnosis, and therefore, CHIKV has not yet been reported in Nepal. For

Figure 1. Map of Nepal (districts) showing CHIK fever reported area



example, on the basis of past medical history and the presence of IgG antibody, patient 1 might have been infected with CHIKV about four months ago, because the IgG antibody can be detected four months after the onset of CHIK fever [6]. Studies have shown that rapid tests tend to have lower levels of sensitivity but high specificity levels [7,8,9]. To date, aside from CHIKV, other alpha viruses have not been reported in south Asia; the positive results in this study are therefore likely not due to cross-reaction with other alpha virus antibodies. Importantly, the evidence from this study suggests that the most likely CHIKV cluster area is in Dhading district (Figure 1), though further study with more focus on CHIKV is warranted to confirm or refute this hypothesis.

Ae. aegypti, the primary vector of CHIKV and DENV, has already become established in Nepal. It can be thus postulated that CHIKV infection may have already spread to other parts of the country together with DENV infection. The overlap in symptoms between DENV and CHIKV is a major challenge for the physician in making an accurate diagnosis and appropriately managing the illness. Laboratory testing can play a vital role in identifying CHIK fever from other febrile illnesses; highly sensitive and specific rapid tests should therefore be made available at district-level hospitals in particular. Although previous observations suggested that CHIKV does not progress to the severe or fatal hemorrhagic fever syndrome and is considered a relatively benign self-limiting illness, neurological manifestations along with other complications have been reported more frequently in recent years [1,10]. Moreover, a recent study suggested that CHIKV may induce transient immune suppression that allows opportunistic infections to cause disease in patients [11].

In conclusion, in light of the first reported CHIK fever cases in Nepal, it is imperative to consider CHIKV infection in the differential diagnosis when evaluating patients with fever and joint pain.

References

1. Powers AM, Loque CH (2007) Changing patterns of chikungunya virus-emergence of a zoonotic arbovirus. J Gen Virol 88: 2363-2377.
2. Lahariya C, Pradhan SK (2006) Emergence of chikungunya virus in Indian subcontinent after 32 years: A review. J Vector Borne Dis 43: 151-160.
3. Pun SB (2011) Dengue: An emerging disease in Nepal. J Nepal Med Assoc 51: 203-208.
4. Takasaki T, Kotaki A, Nishimura K, Sato Y, Tokuda A, Lim CK, Ito M, Tajima S, Nerome R, Kurane I (2008) Dengue virus type 2 isolated from an imported dengue patient in Japan. First isolation of dengue virus from Nepal. J Travel Med 15: 46-49.
5. Singh P, Mittal V, Rizvi MM, Chhabra M, Sharma P, Rawat DS, Bhattacharya D, Chauhan LS, Rai A (2012) The first dominant co-circulation of both dengue and chikungunya viruses during the post-monsoon period of 2010 in Delhi, India. Epidemiol Infect 140: 1337-1342.
6. Aoyama I, Uno K, Yumisashi T, Takasaki T, Lim CK, Kurane I, Kase T, Takahashi K (2010) A case of chikungunya fever imported from India to Japan, follow up of specific IgM and IgG antibodies over a 6-month period. Jpn J Infect Dis 63: 65-66.
7. Kosasih H, Widjaja S, Surya E, Hadiwijaya SH, Butarbutar DP, Jaya UA, Nurhayati, Alisjahbana B, Williams M (2012) Evaluation of two IgM rapid immunochromatographic tests during circulation of Asian lineage Chikungunya virus. Southeast Asian J Trop Med Public Health 43: 55-61.
8. Blacksell SD, Tanqanuchitcharnchai A, Jarman RG, Gibbons RV, Paris DH, Bailey MS, Day NP, Premaratna R, Lalloo DG, de Silva HJ (2011) Poor diagnostic accuracy of commercial antibody-based assays for the diagnosis of acute Chikungunya infection. Clin Vaccine Immunol 18: 1773-1775.
9. Yusuf NW, Kausar N, Akbar R, Iqbal N (2008) Comparison of diagnostic efficacy of rapid diagnostic devices for dengue virus infection- a pilot study. J Ayub Med Coll Abbottabad 20: 26-28.
10. Singh SS, Manimunda SP, Sugunan AP, Sahina Vijayachari P (2008) Four cases of acute flaccid paralysis associated with chikungunya virus infection. Epidemiol Infect 136: 1277-1280.
11. Kumar JC, Vivek Y, Sudhindra P, Dhananjaya B, Kumar AT, Guru K, Kumar A, Heqde MB (2010) Oral candidiasis in Chikungunya viral fever: a case report. Cases J 3: 6. doi 10.1186/1757-1626-3-6.

Corresponding author

Sher Bahadur Pun
Clinical Research Unit
Sukraraj Tropical and Infectious Disease Hospital
G.P.O.Box: 8975, E.P.C.No.1196,
Kathmandu, Nepal
Email: drsherbdr@yahoo.com

Conflict of interests: No conflict of interests is declared.