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Case Report

Dengue fever in Morocco: result of surveillance during the year 2017 and first imported cases

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ABSTRACT

Dengue is a significant mosquito-borne infection in humans, and its worldwide prevalence is rapidly increasing. The vector *aedes albopictus* has been revealed recently in the town of Rabat. Morocco established a program of active surveillance of dengue fever comprising many hospitals and laboratories across the kingdom. The purpose of this work is to describe the result of the surveillance of the dengue virus (DENV) infection during the year of 2017 among Moroccans and tourists who presented in our hospital with clinical signs of infection and to report the first confirmed positive cases of Dengue.

From 20 December 2016 to 20 December 2017, 21 patients were hospitalized for suspicion of DENV infection. Half of them were returning from Côte d'Ivoire which is a popular tourist and business country for Moroccans and where an outbreak of DENV was confirmed on July 2017. Fever, headache, arthralgia-myalgia and malaise in addition to the notion of return from an endemic country justify in clinicians the demand for analysis of detection of dengue virus by RT-PCR.

Dengue infection was confirmed in two patient both coming from Côte d'Ivoire, a Moroccan and an Ivorian who were staying in Abidjan during the period of the outbreak of 2017.

Keywords: Dengue, Imported, Morocco, RT-PCR, Surveillance

INTRODUCTION

Dengue fever (DF) is a mosquito-borne viral illness with 100 million new cases occurring worldwide. DF is an acute febrile illness caused by *Aedes aegypti* and *Aedes albopictus*.[1,2] There are four dengue virus (DENV) serotypes, and infection results in dengue fever or dengue haemorrhagic fever.[3,4]

The incubation period is 3 to 14 days, and clinical manifestations range from mild symptoms, typically including fever, headache, rash, myalgia and arthralgia, to life-threatening haemorrhagic fever and severe shock.[5,6] DF was first discovered in 1779 in Batavia and, a year later, a pandemic of DF occurred in Philadelphia, USA.[7] Dengue fever is currently regarded as the most important arboviral disease internationally. Dengue is widespread throughout the tropics, with local variations in risk influenced by rainfall, temperature and unplanned rapid urbanization.[1]

Estimates indicate that about 100 to 390 million DENV infections occur annually and 2,5 to 3.9 billion people in 128 countries of Americas, South East Asia, the Eastern

Mediterranean, the Western Pacific and Africa, are at risk of infection with DENV.[1,8,9]

In Morocco, the vector *aedes albopictus* has been recently revealed in the town of Rabat.[10] Morocco is either declared as non-endemic for dengue or dengue data are not available and to our knowledge, even imported cases have never been reported.[11,12]

It is for these reasons and because of the more and more frequent exchanges and travels with endemic African and Asian countries that the kingdom has established a program of active surveillance of dengue to which our laboratory participates.

The purpose of the work is to describe the result of the surveillance of the DENV during the year of 2017 among Moroccans and tourists who presented in our hospital with clinical signs of infection and to report the first confirmed cases of Dengue.

Surveillance activity of the dengue virus infection

From 20 December 2016 to 20 December 2017, 21 patients suspected of DENV infection were hospitalized in the Center of Virology, Infectious and Tropical Diseases (CVITD) in the Military Hospital Mohamed V in Rabat-Morocco. Suspicion of the infection was based on epidemiological data and clinical history and symptoms as described in WHO recommendations.[13]

The mean age of patients was 33.1 years (+/-11 years); 17 were male (81%). Nationalities of patients were Morocco (n=17, 80%), Côte d'Ivoire (n=3, 15%) and Gabon (n=1, 5%).

They returned from Côte d'Ivoire (n=10, 47,5%), Malaisia (n=3, 14%), other countries (Gabon, Indonesia, Tanzania, Bangladesh) or having travelled to several african countries (n=4, 19%). The medium length of stay in the endemic area was 30 days (+/-19 days).

The fever, being the major symptom during the consultation (100% of the cases) assignee with the notion of return of an endemic area justified the hospitalization and the demand for detection of the DENV.

The other clinical symptoms were as follows: headache (80%) arthralgia and myalgia (60%) malaise and chills (85%). None of the patients had rash or haemorrhagic signs. Malaria research has always been negative, and leukopenia and thrombocytopenia have been observed in half of the patients suspected of DENV infection.

Laboratory confirmation of DENV infection was done by molecular testing on ABI 7500 Real Time PCR System (Applied Biosystems®, Foster City, CA, USA) by using RealStar® DENGUE RT-PCR Kit (Altona Diagnostics, Hamburg, Germany). The result was positive for two patients, a Moroccan and an Ivorian.

CASE REPORT

The first case was a 17 years-old Moroccan male expatriate since 2005 in Abidjan, Côte d'Ivoire. He was vaccinated two years ago against yellow fever and Tick-borne encephalitis. He came to Morocco on 25th July for the summer vacation. The disease started one day after his return from Abidjan. He suffered a fever (39°C) that appears quickly, headaches and nausea, muscle and joint pains.

Two days later, he presented to the CVITD. The body temperature was 38.5°C and the somatic examination was without particularities.

The biological reports of the examinations carried out at the admission showed no leukopenia, no thrombocytopenia and no elevation of transaminases and C-reactive protein. After ten days of symptomatic treatment, the patient showed no clinical signs.

The Second case was a 35 years-old Ivorian male living in Abidjan, Côte d'Ivoire. He comes to Morocco on 25th July for a medical training. Two days after arriving in Morocco, he had fever, severe headache, arthralgia and asthenia. On the fifth day of his arrival, he presented at the CVITD where he was hospitalized. The examination shows no hemorrhagic symptoms, neither conjunctivitis, nor rashes but his temperature was always high (38.8°C).

The biological analysis showed a leukopenia (3 100/µl), a thrombocytopenia (76 000/µl), a slight anaemia (120g/l) and elevated transaminases (AST = 126 IU/L, ALT = 164 IU/I) while the C-reactive protein was normal. After two weeks of hospitalization, the patient had a negative viremia, his condition improved, and he left the CVITD.

DISCUSSION

The geographical distribution of DF across the world has rapidly expanded in recent decades.[14,15]

Globalization and modern lifestyle changes have increased the number of international travelers around the world. Importation of DF cases has become an important means by which the dengue virus (DENV) spreads to local *Aedes aegypti* and *Aedes albopictus* mosquitoes, particularly in currently non-endemic countries.[16-18]

In parallel, in recent years, the number of Morocan tourists visiting the dengue endemic countries rose exponentially,[19] also, economic and diplomatic relations between Morocco and various African and Asian countries reinforce considerably. Consequently, the risk of the pathogen importation to Morocco from abroad and therefore local transmission is substantially increased.[9]

The two patients DENV positive come from Côte d'Ivoire which is a popular tourist and business spot for Moroccans[20] and where an outbreak of DENV was

confirmed on July 2017. Indeed, on 6 May 2017, the Ministry of Health of Côte d'Ivoire notified World Health Organization (WHO) of a dengue fever outbreak in Abidjan. On July 2017, a total of 192 cases (confirmed by PCR) including two deaths have been reported.[21]

Both positive patients we report were in Abidjan during the 2017 outbreak period and were most likely bitten by infected mosquitoes. To our knowledge, this is the first imported cases of Dengue in Morocco where there is, until now, no autochthonous circulation of the virus.

The frequency of DENV infection in febrile patients returning from endemic areas in our series (9.5%) was lower than in other studies. A. Pierro et al. Have found a frequency of 20.5% among travelers returning to Emilia-Romagna in Italy. In this surveillance system, which was considered efficient by the author, the dengue diagnostic workflow included serological analysis, antibody titers, and RT-PCR.[22]

In our series, in all prescriptions, the WHO recommendations on the "suspected subject" of DF were respected since all the suspect patients presented the two major conditions which are the notion of return from an endemic country and the fever. Our surveillance system, which began at 2015, shows a relative efficiency. Hence the need to involve clinicians even more in the detection of the disease in people returning from an endemic country through training and awareness. Despite this, surveillance demonstrates the importance of the threat of dengue fever in non-endemic areas such as Morocco. Thus, control measures should be routinely performed and proper diagnosis of arbovirus infections in travelers is necessary to recognize the infection.[23]

CONCLUSION

Dengue fever outbreaks and epidemics are frequently reported in Africa, with recent outbreaks occurring predominantly in the Eastern region.

We have reported the result of the activity of surveillance of dengue Infection in 2017. Two cases of imported dengue infection were acquired in Abidjan, Côte d'Ivoire during the period of the outbreak of July 2017.

Detection of an imported Dengue fever in Morocco highlights the need for clinicians to consider Dengue in the differential diagnosis of fever in all persons coming from an endemic area of DENV and informations on dengue epidemics should be routinely provided to the medical community and individuals who are planning travel abroad.

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